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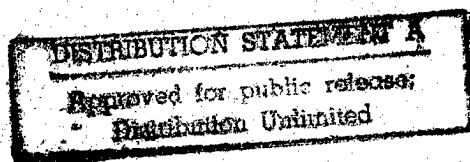
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9 February 1984

# USSR Report

ENERGY

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9 February 1984

USSR REPORT  
ENERGY

## CONTENTS

## ELECTRIC POWER

## OIL AND GAS

- Achievements of Azerbaijan Specialized Drilling, Well  
Workers Crews Outlined  
(VYSHKA, 14 Oct 83)..... 1
- Experts Solve Drilling Problems, by V. Gol'tsev  
Crews Achieve Successful Workovers, by S. Bagdiyan
- Clearing Vyborg Channel for Semisubmersible Drilling Rigs  
(L. Arkad'yev; STROITEL'NAYA GAZETA, 5 Oct 83)..... 4
- Well Workover Crews Aid Production at Shirvan Field  
(S. Garayev; VYSHKA, 13 Nov 83)..... 6
- Amortization Rules Fail To Promote Longer Drilling-Equipment  
Service Life  
(A. Z. Romanov, I. Ye. Rudavskiy; NEFTYANAYA PROMY-  
SHLENNOST': SERIYA 'EKONOMIKA'; No 9, Sep 83)..... 7
- Equipment for Secondary Recovery of Oil  
(Yu. Perepletkin; IZVESTIYA, 23 Oct 83)..... 11

## COAL

- Deputy Minister Surveys Ukrainian Coal Industry  
(P. N. Ivanov; PRAVDA UKRAINY, 16 Sep 83)..... 13
- Ferrous Metallurgy Official Urges Better Use of Coke  
(A. Kogadeyev; SOTSIALISTICHESKAYA INDUSTRIYA,  
21 Oct 83)..... 16

Coal Washbox at Chelyabinskugol' Described (A. Yermakov; SOTSIALISTICHESKAYA INDUSTRIYA, 17 Sep 83) .....	20
Yuzhkuzbassugol' Operations, Plans Summarized (N. Manuylov; EKONOMICHESKAYA GAZETA, No 43, Oct 83) .....	22
Ukrainian Association Develops New Methods of Mine Water Control (A. Pshenichnyy; IZVESTIYA, 13 Sep 83) .....	25
Ways of Improving Efficiency of Mine Preparation Work in Donbass Analyzed (A. A. Manzhula; UGOL', No 9, Sep 83) .....	27
New Excavation Equipment for Ekibastuz (N. Mozhin, et al.; NARODNOYE KHOZYAYSTVO KAZAKHSTANA, No 8, Aug 83) .....	34
Prospects for Improvements in Mine Preparation Operations Outlined (V. D. Nikitin; UGOL', No 9, Sep 83) .....	38
New Conveyor Under Construction at Kansk-Achinsk (Yu. Vakhurin; GUDOK, 12 Oct 83) .....	44
Briefs	
Magadan Mine	45
Above Plan Coal	45
Voroshilovgrad Miners	45
Mine Construction	45
Zhitomir Mine	46
Donbass Productivity	46

#### ALTERNATE FUELS

Peat's Role in Building Up Peaty Regions Needs Greater Study, Planning (V. N. Kolesin, et al.; TORFYANAYA PROMYSHLENNOST', No 10, Oct 83) .....	47
Selected Synopses of Articles in TORFYANAYA PROMYSHLENNOST', October 1983 (TORFYANAYA PROMYSHLENNOST', No 10, Oct 83) .....	53

## FUELS

### NUCLEAR POWER

Construction Progress at Ignalina AES (Yu. F. Zhilin Interview; SOVETSKAYA LITVA, 13 Sep 83).....	55
Scientists Assist Ignalina AES Startup  (Yu. Stroganov; SOVETSKAYA LITVA, 21 Oct 83).....	59
First Unit Begins Operation at Ignalina AES (Yu. Stroganov; SOVETSKAYA LITVA, 5 Oct 83).....	61
Briefs	
Increase in Electricity	64
Zaporozhye Atomic Plant's Progress	64
Gorky, Voronezh Get 'AST' Parts	64
Ignalina AES Start-up	65
Atomic Energy Agency Meeting	65
Record 70-Ton Ingot Cast	65

### NON-NUCLEAR POWER

Leningrad Metallurgy Plant Delivers Turbines to Sayano-Shushenskaya GES (L. Ivankin; LENINGRADSKAYA PRAVDA, 21 Sep 83).....	66
New Advances in Electrical-Insulation Materials (F. Sapozhnikov; PRAVDA, 3 Sep 83).....	69
Briefs	
Minelektrotekhprom Agrees With Criticisms	71
Power Lines to Ocean	71
Energy Workers Overfulfill Plan	71
Severnaya TES Nearing Completion	72
Boilers Now Lighter	72
New Boiler Cleaning Equipment	72
New 300,000 kw Turbogenerator	73
Generation Unit Proves Economical	73
Rail-Crane for Surgut GRES	73
GRES Near Samotlor	73
Gusinozersk GRES Construction Continues	74
Ukraine Receives Siberian Gas	74
Angren GRES Smokestack Completed	74

## OIL AND GAS

### ACHIEVEMENTS OF AZERBAIJAN SPECIALIZED DRILLING, WELL WORKOVER CREWS OUTLINED

#### Experts Solve Drilling Problems

Baku VYSHKA in Russian 14 Oct 83 p 1

[Article by V. Gol'tsev: "A Creative Search"]

[Text] The special office for the operation of submersible electric oil field installations of "Azneft" [State Association of the Azerbaydzhan Petroleum Industry] is not a large enterprise. But already it is not the shop which was placed here twenty years ago. Next to the old, abutting accommodations, new, spacious buildings have been raised which have modern equipment. In one of them production has been set up for corundum chokes which are widely used in the petroleum industry.

"The expansion and renewal of production", says M. Ginzburg, chief engineer of the special office, "creates healthy and reliable conditions for work and good possibilities for increasing the reliability of submersible electric installations."

Many years of practice have shown that pumps work longer, the more favorable the medium in which they are used. Therefore, associates of the production department headed by Yu. Pavlenko painstakingly and thoughtfully familiarized themselves with oil field documentation selecting from the whole stock only ten wells suitable for this purpose. How many oil platforms are there? - there are so many problems.

So it was, for instance, at the Zyrya section in the "Azizbekovneft" NGDU [Azizbekov Oil and Gas Producing Administration]. There, in all, six compressor wells operated but the troubles with them were too much for the oil field men. Large expenditures for the production of compressed air promoted increased costs for oil. Then the oilmen turned to the special office for help. The effort, however, to exploit the wells with ordinary, serially manufactured centrifugal pumps was unsuccessful. The high temperature of the liquid being pumped out and the large mechanical impurities in it quickly put the equipment out of operation.

"Two years ago", says Yu. Pavlenko, "domestic industry began to produce electric motors resistant to high temperatures, and we recommenced the work. It went quickly when, in the "Azizbekovneft" NGDU, the eighth operational section of the office was created and headed by engineer Dzhabar Bagirov."

The exploitation of the wells was supposed to be carried out in two stages. At first they were equipped with PED-45 type electric motors with pumps having an output of 130 "cubes" [cubic meters]. Investigation showed, however, that the productive potentials of the formation were being used insufficiently. Then, in exchange for them, it was decided to lower more powerful, type PED-90, electric motors which provide for pumping out 250 m<sup>3</sup> of liquid per day. In this connection, the necessity arose to organize the repair of such motors by our own staff. So that the principal work would not suffer, wire for the windings of the electric motors was delivered early to the enterprise. But by now, the work was not done outside of the brigade of M. Mkrttychev, a foreman of high qualifications. The complicated technology for the repair of the new motors was mastered in a short time collectively by Mkrttychev's friends, V. Salmanov, R Suchilin, and S. Sultanov. The daily care of engineer I. Shadunts for the organization of labor, the strengthening of discipline, and order in the work place contributed to this in many respects, assuring success.

"Zyrya", says V. Rafiyev, director of the special office, "reminds me very much of the Chureshti deposits in Rumania where last year a group of specialists from our enterprise successfully carried out the experimental industrial introduction of domestic installations and assisted in organizing their repair there. For us these motors have given good results. It is enough to say that introduction of them on the platform at Zyrya made it possible to shrink the whole compressor station."

The successful experiment is one more evidence of the availability of unused capabilities for oil production. Actually, the fitting of wells with high capacity pumps is also possible on other platforms in Azerbaijan, Georgia, and Turkmenia, where operational sections of the enterprise already are working. But there are difficulties and problems. Pumps with high resistance to wear are needed.

A collective of workers and specialists of this enterprise are working right now on the creation of equipment having a large reserve of strength.

#### Crews Achieve Successful Workovers

Baku VYSHKA in Russian 14 Oct 83 p 1

[Article by S. Bagdiyan: "Annual Limits Lie Behind"]

[Text] Workers of the first and second oil fields of the "Azizbekovneft" NGDU [Azizbekov Oil and Gas Producing Administration] are carrying out planning work to uncover unused capabilities for increasing the recovery of oil from exhausted formations. Since the beginning of the year each collective was able to send to the reservoirs more than 1,300 tons of fuel in addition to the assignment, over fulfilling by far the projected socialist obligations.

In the selection of the geological and technical steps to be taken, the oil field men are giving much attention to the consolidation of the grid for the development of the deposits because of wells standing idle, especially those among them where there is still a possibility to draw out the remaining oil from sites of lowered productivity.

In this connection, the personnel of the second section of the department for major repairs to wells, headed by communist Feyzulla Aliyev renders effective aid.

The brigades of the experienced foremen Ziyadkhan Shakhmardanov and Kazanbek Isabekov lead the labor competition of the section. Both collectives for many years have specialized in the repair of wells, repairing them by the method of side-tracking and drilling a new operational stem. The technology of these operations which are complex in the extent of the operations is carried out by them with great diligence and skill. Thus, recently on the territory of the first department, foreman Shakhmandarov's brigade returned well No 1357 to the oil field men with the leading monthly flow in oil and gas output. After its opening up, it went into operation with a steady yield of 5-6 tons per day. Before its capital repair, work was rapidly completed on two other idle wells which now, from sites with reduced productivity, are yielding 6-7 tons of fuel a day.

Shakhmandarov's brigade, in restoring three idle wells since the beginning of the year, is the first in the department to have carried out the annual assignment ahead of schedule.

Such success also was achieved by Kazanbek Isabekov's brigade. In accordance with the order of the geological service of the second department, it also restored three wells. The last of them - the 438th - after lowering the flow string, has been prepared for perforation. Here the oil field men expect to obtain not less than 3-4 tons of fuel.

"The successes of Shakhmandarov's and Isabekov's brigades does not just happen", says Ali Dzhabrailov, the chief of the department. "Each of them is distinguished by a strong labor and performance discipline, and by the skillful use of the potentials of the new equipment and technology."

The leaders of the competition reexamined the obligations adopted earlier and then adopted new ones. They decided to make capital repairs to one more well before the end of the fourth quarter.

The collectives of foremen K. Kafarov, G. Khalilov, A. Narimov, M. Guseynov and N. Safikuliyev also work at great speed.

It is not by chance that the workers of the department as a whole, supplementary to the assignment for 9 months, have accomplished 22 well repairs. By the end of the year, the number will rise by another five units.

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## OIL AND GAS

### CLEARING VYBORG CHANNEL FOR SEMISUBMERSIBLE DRILLING RIGS

Moscow STROITEL'NAYA GAZETA in Russian 5 Oct 83 p 1

[Article by L. Arkad'yev of the press center of the Ministry of Installation and Special Construction Work: "An Explosion Moves Rock".]

[Text] The thunder of a mighty explosion shattered the quietness over the spacious sea. When the column of watery spray that had been lifted into the air had dispersed, it became apparent that the rock had been moved ten meters.

I observed all this with powerful binoculars from the building way of the Vyborg shipyard from which a huge offshore oil drilling platform had recently been launched.

"Our task" says foreman Yuriy Ivanovich Kashirin, "is to take the underwater rock out of the path of such platforms and to significantly widen the course of the channel for their passage."

With him, I go onto a diver's boat passing the drilling rig. From such semisubmersible platforms, to the production of which the enterprise's staff of shipbuilders has turned, oilmen will carry out drilling in seawater depths of 200 meters. The giant platforms, having a displacement of 20,000 tons, will make it possible to penetrate the continental shelf to oil deposits lying at depths of up to 6,000 meters. And although installation work is still proceeding at full speed and the electric welding glitters, the preparation for taking the monster out to sea has unfolded. In the water area connecting the shipyard with the Saymensk canal, underwater explosions are being prepared. Every now and then ships greet our boat - here, the waterway between our country and its northern neighbor has been revived.

In such conditions, the preparation and conduct of underwater, focused explosions is an especially responsible undertaking. To interrupt shipping for a long time is clearly impossible - it is too costly. The safe conduct of the operations is the first priority in the plan. In a brief "window" of time the explosive materials are brought in. Divers set the explosive in a prepared box on the bottom, and then the blasting specialistst come into the business. Subdivisions of the Gidrospeetsfundamentstroy [Hydrotechnical Special Foundations Construction] Trust and the Soyuzvzryvprom Minmontazhspeetsstroya SSSR [Trust for the Conduct of Drilling and Blasting Operations of the USSR Ministry of Installation and Special Construction operations] have been commissioned to do the work.

"Yesterday was a difficult day" slowly recounted Vladimir Viktorovich Kosakovskiy, the senior diver who has spent more than 6,000 hours under water (rare for a diver-builder!). "The visibility at working depth is a half meter working with a lantern."

From early in the morning until late evening, clothed in heavy armor, they go into the depths to the foot of the rock. They are the divers Nikolay Kotlyarenko and Anatoly Shcherbakov and also their foreman, Vladimir Viktorovich Kosakovskiy who is a diver with 22 years of service and a participant in the construction of many underwater facilities in almost all corners of our country.

We come up to the rock. Its profile is visible from afar - there are foam plastic floats in the water. Boats scurry around the rock and people pay out red cords from them - they are installing a detonation protection system.

"This system is needed to save fish" says Fedor Alekseyevich Avdeyev, chief engineer of the Soyuzvzryvprom Trust. "When the explosion goes off, minute air bubbles spring up around the system. Through their screen the shock wave is weakened many fold and does not harm the fish."

Here now from a boat, the experienced blasters B. Metelkin, N. Vikhrov, and V. Lebedev are lifted on board. Imperceptibly the water area is deserted, and all passages are closed to ships. We go a safe distance away from the rock. The seconds drag tiresomely. A red rocket soars into the sky - and here from the water a huge watery mound swells and rises to the very clouds. The wind brings the rumble of the underwater explosion.

The whole flotilla of blasters and divers rush to the place where the rock had stood. It had been moved by the peaceful explosion.

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## OIL AND GAS

### WELL WORKOVER CREWS AID PRODUCTION AT SHIRVAN FIELD

Baku VYSHKA in Russian 13 Nov 83 p 1

[Article by special correspondent S. Garayev: "The Great Contribution of the Repairers"]

[Text] Oilmen of Shirvan are confidently increasing the extraction rate for oil extracted above plan. They have exceeded the annual socialist obligations for the production of oil and gas. In addition to the 10-month assignment, more than 6,000 tons of liquid fuel and 8 million m<sup>3</sup> of blue fuel have been pumped into the reservoirs. It is notable that the initiators of the slogan: "From every well, the maximum output" achieved such success because of improved engineering and technical operations on the stock of active wells, many of which, after the effective geological and technical measures, increased their output significantly.

In the accomplishment of the targeted measures for stabilizing the production level, the well worover brigades have provided substantive help to the oil field men. Since the beginning of the year, the department collective reactivated 8 dead wells, made capital repairs at 394 sites, and, as a result, 32,000 tons of additional oil were obtained. This is the great service of the leading repair brigades led by the experienced foremen S. Radzhabov, F. Salimov, G. Amirov, and A. Iskanderov. Thanks to their high quality work, one-third of the repaired wells were put into operation significantly ahead of schedule which saved state funds in the amount of 60,000 rubles.

The well workover brigade headed by the labor-veteran Amir Iskanderov made a large contribution to the general success. This brigade is definitely leading the competition, setting an example in the rapid and qualitative placing of wells into operation, and in skillfully using available equipment, tools, and working time. As a result of their creative attitude toward the work at hand, the leading brigade already has fulfilled the assignment for the fourth year of the Five-Year Plan. In this period A. Iskanderov's brigade has repaired 76 oil wells instead of the planned 49. Because of this alone, the oilmen obtained about 6,000 tons of oil.

At present, the second quarter of 1985 is on the work schedule of drillers T. Musayev and N. Magerramov, assistant drillers F. Faradzhev and A. Suleymanov, and the other members of the brigade of communist labor. Today the collectives of the remaining workover brigades also are making maximum efforts to secure the success of the oilmen of Shirvan.

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AMORTIZATION RULES FAIL TO PROMOTE LONGER DRILLING-EQUIPMENT SERVICE LIFE

Moscow NEFTYANAYA PROMYSHLENNOST': SERIYA 'EKONOMIKA' (REFERATIVNYY NAUCHNO-TEKHNICHESKIY SBORNIK) in Russian No 9, Sep 83 pp 10-11

[Article by A. Z. Romanov and I. Ye. Rudavskiy (VNIIBT [All-Union Scientific-Research Institute for Drilling Equipment]) and VNIIneftemash [All-Union Scientific-Research and Design Institute for Petroleum Machinebuilding]): "Amortization Deductions and the Longevity of Drilling Equipment"]

[Text] In the article, "The Science of Karl Marx and Certain Questions of Building Socialism in the USSR," CPSU Central Committee General Secretary Yu. V. Andropov\* pointed out: "A large proportion of the deficiencies that at times disturb normal operation in the various sections of our national economy are caused by deviations from the norms and requirements of economic life.... Our work that is aimed at improving and restructuring the economic mechanism and forms and methods of control has lagged behind the demands made by the level...of development of materials and equipment that Soviet society has reached...."

An examination of one of the questions of the economic activity of enterprises that are connected with the creation and use of drilling equipment is of interest.

In order to compensate for the natural decline in recovery at existing oil-fields, a much larger number of exploration and production wells are now required than at the beginning and middle of the 1970's. It has not been possible to cover the increase in drilling volume with growth in labor productivity--an expansion of the drill-rig pool is required. Because of this, an increase in drilling-equipment longevity is an important element in improving savings in our national economy. A rise in the durability of equipment components is equivalent to a corresponding output of new drill rigs, reduces metal and power consumption in machinebuilding, and enables more rational use of the country's labor resources. The necessity and desirability of developments that will increase durability of drilling equipment are obvious. Many design-development organizations and machinebuilding enterprises are working in this area. But the actual service life of equipment depends in the highest degree upon the level of its operation and servicing by the user in the UBR's [drilling administrations] and other similar drilling enterprises. However, the attitude of the user depends upon a number of factors, among which the

\*KOMMUNIST, No 3, 1983

financial incentives for enterprises to prolong the actual service life of the equipment are of no little importance.

Amortization of equipment is called a transfer of its cost to the cost of the product it produces or the work it performs. According to this definition, an increase in actual equipment service life should reduce the prime production cost of the product, and, as a consequence of this, it should be profitable to the user. In practice, something else happens. Let us trace by stages the flow of payments for equipment during the period between its output by the manufacturer and its writeoff at the UBR. In addition to these two organizations, the receiver of the drilling administration's product (drilled wells)--the NGDU [oil and gas recovery administration]--and the state's financing organizations, which for brevity we shall call the "Bank,"\* participate in the payment flows.

Stage 1. The UBR (in the final analysis) obtains the funds for acquiring a unit of drilling equipment. The Bank releases the funds, which are transferred to the manufacturer. At this stage the manufacturer has made up for his expenses; and the UBR has received the equipment without investing its own funds: the Bank has turned over the funds without having been reimbursed.

Stage 2. The unit of equipment is entered on the UBR's books. From this moment, under the current "Statute on the Procedure for Planning Charges and the Use of Amortization Deductions in the National Economy" (approved 15 March 1974), the Bank collects from the UBR each month a share of the cost of this unit of equipment. These are called amortization deductions. The monthly amortization deductions are governed by the equipment's rated service life (the norms are set as a function of the type of equipment) and are distributed uniformly over this period, so that, upon its expiration, 100 percent of the cost of this unit of equipment will have been returned to the Bank. (For simplification, which does not affect the results of the examination being conducted, deductions and payments for overhauling the equipment are not counted here.) By the end of the period, the Bank's expenditures and the return of funds to it turn out to be balanced. Amortization deductions are not collected for equipment that is written off, and, in the case of premature writeoff (sometimes for equipment that has not even started to work), the Bank has not been reimbursed completely for its expenditures. In order to compensate for losses that occur this way, the Bank, under the existing rules, continues to receive the amortization deductions in the full amount from the equipment that remains on the UBR's books, even after completion of the rated service life. If the regulation rated service life has been chosen with precision, then the Bank has no losses and its expenditures at this stage are reimbursed.

Stage 3. In transferring drilled wells to the NGDU, the UBR recoups its expenditures and its payments for the equipment. At this stage, the balance

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\*The term "Bank" is understood to mean the set of state organizations that distributes funds and financing for the purchase of the new drilling equipment. In other words, this is the state economic structure as a whole, except for the UBR, the NGDU and the manufacturing plant. The adopted scheme of participants enables influences that do not affect solution of the task being examined to be excluded from the examination.

of the deductions and the receipts of the funds for the equipment for the UBR coincide.

What has been said above relates to the case of a correct choice of regulated equipment service life. Let us examine cases where this period does not correspond to the actual period. If the rated service life has been underestimated, then the Bank has a plus result, and consumption of the equipment grows because of early writeoff, but the UBR does not bear the losses, since its expenditures on the equipment are automatically transferred to an increase in the prime cost of recovering crude oil. The national economy as a whole loses in this case.

If the equipment's rated service life has been overestimated, then the Bank does not make up its expenditures, and the UBR does not gain anything, but, since the physical deterioration of the equipment is retained, the prime cost for recovering oil remains as before. The national economy as a whole thus suffers a loss in this case (through the Bank's monetary loss). Since the probability of a precise choice of the rated service life is very small, one cannot say that the scheme for amortization deductions that has been adopted at present is optimal.

On the other hand, the balanced state of the payments for the equipment on the part of all interested parties taken separately does not consider all of the economic aspects of actual amortization. An examination of the flow of payments does not reflect the national economy's losses in case the drilling equipment of the UBR goes out of commission prematurely. Moreover, by the end of the rated service life, the equipment's productivity is reduced considerably, it requires great attention during operation at the drilling site, and expenditures of funds and labor for repairs are increased. And, along with this, amortization deductions are paid for it, the same as for new equipment. Therefore, the UBR tries to get rid of old equipment, including serviceable equipment, and to obtain new equipment in place of it. The UBR has no direct financial incentive to retain the equipment. An indirect incentive exists. In particular, it can be associated with the need to carry out the production plan where there is a shortage of equipment. But the lever of direct financial incentives is more effective than indirect ones. Let us suppose that a businesslike, energetic worker, an organizer and supervisor, comes to one of the UBR's. Thanks to these qualities, he has been able to persuade superior organizations to "shake out" relatively larger funds for equipment for his UBR than what neighboring UBR's obtain. This UBR mandatorily writes off the old equipment. In this case the capable workers' activity harms the national economy as a whole, but it will be profitable for the UBR collective, which copes more easily with the plan task and will have technical and economic indicators better than those of other UBR's.

A direct financial incentive is capable of precluding such possibilities. It can be provided, for example, by replacing existing amortization deductions by payments in the range of the cost of the drilling equipment, taking into account interest on credit, regardless of the service life. After payment of the complete cost of the equipment, the UBR will be able to have additional profit

through the difference between the prime cost for drilling by old, less productive equipment without amortization deductions and the designed, budget-estimated cost of the drilling. In this case, the UBR will be motivated to write off equipment which will not yield the above-indicated additional profit, even where there is an abundance of new equipment. Given rational regulation by a progressive tax on profit, excessive accumulations of funds for consumption in the UBR can be avoided. The existence of a direct financial incentive will increase the attention of UBR personnel toward measures for increasing the actual service life of the equipment during its operation.

It is desirable that the efforts of designers, production engineers, and collectives of machine building plants of the petroleum industry be backed up by improvement of the economic levers for controlling the UBR's economic activity. Otherwise, the realization of many useful developments and technical improvements aimed at increasing the equipment's longevity will not be capable of getting proper support at the fields.

As emphasized in the indicated article, "In order to speed up the progress of the productive forces, appropriate ways for organizing economic life are necessary....Today we face the task of reasoning out and subsequently executing measures that can yield great scope to the work...of the creative forces...in our national economy."

Conclusions. Studies of measures for increasing drilling-equipment durability are of great national economic significance. The greatest benefit from executing them can occur where there is an improved system of amortization deductions with the provisioning of directive financial incentives to the UBR.

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## OIL AND GAS

### EQUIPMENT FOR SECONDARY RECOVERY OF OIL

Moscow IZVESTIYA in Russian 23 Oct 83 p 1

[Article by special IZVESTIYA correspondent, Yu. Perepletkin: "The Second Life of an Oil Formation"; material between slantlines is rendered in boldface]

[Text] /Unique equipment has been developed in our country; this equipment makes it possible to substantially increase extraction of oil from the depths./

At Samotlor the first gas-lifting compressor station completely supplied by domestic industry is being prepared for start up. The brigade of Hero of Socialist Labor and Deputy to the RSFSR Supreme Soviet N. Nezhdanov is constructing the unique facility.

Along the shores of the Ob the foliage is golden and the surfaces of the lakes have become dark and cold blows from them. We drove out along the concrete to the Samotlor side with G. Pikman, the first builder of Nizhnevartovsk--now the assistant for management with the "Megiongazstroy" [Megion Gas Construction] Trust. Despite his considerable age, Grigory Il'ich is as energetic as almost two decades ago when everything--towns, roads, and oil fields--was just beginning here.

"We must get the production of such gas-lifting stations on the assembly line," says G. Pikman heatedly. He is an enthusiastic and convinced advocate for their construction.

For what are they needed? Oil wells drilled down into the oil deposits of western Siberia sometimes are free flowing. But a period comes--at a number of deposits it has already arrived--when the oil has to be pulled up to the surface. This is a complex and costly business. There are various methods of withdrawing it from the depths. The most advanced, however, is the gas-lifting method. It is the future--such is the opinion of specialists.

Gas-lifting needs powerful compressor stations for injecting gas into deep formations. It then raises the oil upward as if on a lift. The equipment for such stations has not been produced in our country.



The car makes a stop at the third compressor station. Its first components are essentially prepared for start up. Many enterprises, with which the Nizhnevartovsk people concluded an agreement for collaboration on the principle of "Worker relays," assisted in building this important facility.

KS-3 [Compressor Station 3] is an industrial-test experimental station. But this experiment is not limited to a test of domestic equipment. The station has been erected in a new way. Here, a comprehensive general contracting work flowline has been set up, with payment for labor according to a single job authorization.

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CSO: 1822/82

## COAL

### DEPUTY MINISTER SURVEYS UKRAINIAN COAL INDUSTRY

Kiev PRAVDA UKRAINY in Russian 16 Sep 83 p 1

[Article by P. N. Ivanov, deputy minister, UkSSR Coal Industry: "So That Stars Will Shine on the Mine Headworks"]

[Text] Donetsk miners fulfilled the nine-month program ahead of time. \* In August 28 collectives at previously lagging mines were solidly up to plan. \* Why are they slow with organizing competition under the slogan "For output in the front ranks" at the Oktyabr'ugol', Dzerzhinsk-ugol', Selidovugol' and Pervomayskugol' Associations?

As our paper has reported, a special operational working group has been created at UkSSR Minugleprom to activate socialist competition among collectives at lagging mines under the slogan "For output in the front ranks". P. I. Ivanov, deputy minister of the Ukrainian Coal Industry and the group's chairman, comments on the patriotic movement to overcome lagging at coal enterprises which has arisen among miners.

I want to say right off that competition under this slogan has found fervent support in the sector. In the initial stages all the republic's lagging mines had conferences and shift meetings where there were concerned discussions about improving miners' work. We were guided towards this by the decisions of the November (1982) and the June (1983) CPSU Central Committee Plena.

Many collectives developed specific measures for improving labor productivity, strengthening labor discipline and organizing socialist competition on a qualitatively new basis. The operational working group immediately gave special attention to supervise the fulfillment of the decisions made at enterprises. Every month the UkSSR Minugleprom conducts a selective examination together with directors of production associations and their deputies, in which there is a detailed analysis of last month's work at lagging enterprises and deadlines are set for fulfilling plans and obligations.

The ministry's administration for norm setting for labor and wages and the production-technological administration for underground and open pit coal

production conducts weekly accountings of work at mines involved in competition for output in the front ranks and gives them operational help in breaking up "bottlenecks".

In 8 months miners in the Ukraine extracted more than 80,000 tons of coal above the plan. Thirteen production associations successfully handled the 8 month program. The best work was done by miners at these associations: Krasnoarmeyskugol', Shakhterskantratsit, Sverdlovantratsit and Pavlogradugol'. They considerably increased coal extraction compared to the corresponding period last year. Labor contests between miners conducted under the slogan played a positive role here. This movement already has its achievements. In August, 28 of the 46 collectives at enterprises engaged in competition to eliminate backlogs of coal successfully completed their extraction plans. What is more, 18 of them met all conditions of the competition laid out in the plan program for extraction, preparatory operations, labor productivity growth and reductions in ash content of fuel extracted.

The patriotic movement of miners has become especially widespread in the Donetskugol', Makevugol' and Shakhterskantratsit Associations. However, they are still vacillating at the associations which now have the largest number of lagging enterprises: Oktyabr'ugol', Dzerzhinskugol', Selidovugol' and Pervomayskugol'. It is time to take the matter seriously. There is powerful equipment here but it does not give the planned output because of the low levels of engineering operations in the selection and preparation of work faces, the poor organization of labor at extraction and repair crews and the high rate of machinery breakdown.

Above all, it would pay managers at these associations to seriously study the the approach to sector competition under this slogan which has expanded among their colleagues at the Donetskugol' Association. What is especially important here is their strict control over work at each lagging collective. The Donetsk Party Gorkom gives great attention to this competition. In close contact with the association's directors, it is doing much to see that all coal enterprises work rhythmically, without interruptions.

With what did the gorkom begin? First of all, it carried out weekly operational control over work at lagging coal enterprises. This gave the party committee exhaustive information on the mines' economic lives, made it possible to promptly reveal shortcomings and disruptions and to rapidly respond to them. In other words, it constantly has a hand on the production pulse. The party bureau decided to create a school of progressive experience, "Progressive Experience to the Lagging", which is headed by S. F. Povashnyy, the party gorkom second secretary. How does it operate? Lagging enterprises are visited by a comprehensive commission, the staff of which includes experienced party, soviet, trade union and komsomol workers, leading specialists from Donetskugol', managers and chief specialists from progressive mines. This commission carefully studies the situation on the spot and gives assistance in developing and implementing specific measures directed towards overcoming the backwardness.

I will give just one example. Recently there were problems at the Kirovskaya Mine. A group of workers from the party gorkom and the Donetskugol' Association led by S. F. Povazhniy which visited it made a detailed study of the reasons for

lagging and, together with the enterprise's managers and engineering-technical workers, they analyzed them. The commission told party activists and all workers at the mine of the considerations and conclusions. In developing comprehensive measures for improving production activities use was made of proposals put forward at meetings, conferences and discussions. The mine party committee was given practical help in solving problems involving organizational-party work and in improving the leadership of socialist competition.

Thorough analysis of available reserves and potentials and prompt, effective help permitted the Kirovskaya Mine to overcome its lagging. The party gorkom and the association's directors are now conducting similar work at the Glubokaya Mine, which is also behind. It is not surprising that Donetsk miners are setting the tone in the sector, since the beginning of the year they have extracted 906,000 tons of coal above the plan and on 14 September completed the 9 month extraction program.

In conclusion I will state that the movement under the slogan "For output in the front ranks" has given a fresh impulse to work in the republic's coal industry. It is sufficient to note that the collectives at the 28 mines mentioned above, in completing the August plan, increased coal extraction by more than 120,000 tons.

11574

CSO: 1822/49

## COAL

### FERROUS METALLURGY OFFICIAL URGES BETTER USE OF COKE

Moscow SOTSIALISTICHESKAYA INDUSTRIYA in Russian 21 Oct 83 p 2

[Article by A. Kogadeyev, deputy minister, USSR Ferrous Metallurgy Industry: "Multifaceted Coke"]

[Text] The telegram from the Tulachermet [Tula Ferrous Metallurgy] Scientific-Production Association to the ministry was short: "Due to lack of coke it was necessary to damp down the furnaces. We request that you fill our orders for fuel!" If only this were the sole such signal! There is no denying that many of our plants are frequently sort of coke -- the main fuel for smelting iron.

Why? There are many reasons, but three of them must be distinguished: reductions in the extraction of the most valuable -- coking -- grades of coal, the irrational use of such fuel by blast furnace operators, and its use for purposes having nothing to do with pig iron smelting. In actuality, every 1 out of 8 tons of metallurgical coke goes to other purposes.

I have repeatedly seen the zeal with which many ministry and department representatives defend, at USSR Gosplan, their right to coke for "technological and other needs". It should be noted that so far they have defended it quite successfully, although there are many other types of more accessible fuel. Coke, however, is attractive because of the simplicity of its use, high heat output, universality, and its ability to burn in any oven. All the same, its main purpose is for blast furnace operations and smelting pig iron.

Here, incidentally, is where the greatest reserves for coke savings lie. One of them involves increasing the temperatures of hot blasts. Their sharp increase is saving considerable fuel at the first, second and eighth furnaces at the Magnitogorsk Metallurgical Combine; the third and fourth at the Zaporozhstal', and the sixth at the Azovstal' and Novolipetsk Metallurgical Combine. Nevertheless, the sector average hot blast temperature is increasing only slowly. Specialists at Ukrainian Minchermet (Minister D. Galkin), the VPO Soyuzmetallurgprom and Soyuzspetsstal' (chiefs, A. Kugushin and L. Kosyrev) have much to do.

This involves the replacement of coke by natural gas, each cubic meter of which is equal to 0.8 kilograms of solid fuel. There is good experience here, at the Cherepovetsk, Novolipetsk and Chelyabinsk Metallurgical Combines and the Yenakiyevskiy Metallurgical Plant. At the Orsko-Khalilovskiy Metallurgical

Combine, Krivorozhstal', Zapsib, Dneprovskiy imeni Dzerzhinskiy, Donetsk, imeni Il'ich in Zhdanov and many other plants 1.5 fold less gas is used and excessive coke is consumed.

Metallurgists at the Karaganda Combine are setting an example in the use of mazut instead of coke. This is promising work! However, it is still a long way from a sector scale.

This delays a solution to a basic problem of the 11th Five-Year Plan -- the 33 kilogram reduction (to 500 kg) in the consumption of coke per ton of pig iron production at blast furnace operations. Important measures are being implemented: there are increases in ore iron content, hot blast temperature, the use of coal dust in blast furnaces and the expanded smelting of cast synthetic pig iron as well as improvements in blast furnace technology.

To metallurgists all these concerns are just as pressing as the search for reserves for increasing coke production and improving its quality. They are undoubtedly far from exhausted.

Having called for competition, metallurgy, coke and chemical workers and builders in Chelyabinsk Oblast have given themselves the goal of being ahead of schedule in the introduction and mastery of coke batteries being built and rebuilt. They are supported in the Altay, the Donbass and the Dnepr. More than 100,000 tons of above plan fuel have been attained thanks to the outpacing of production schedules for the introduction and operation of batteries at the Chelyabinsk Metallurgical Combine, the Donetsk, Altay and Zaporozhe Coke and Chemical Plants.

However, this alone will not, of course, change the situation in the subsector. It is important that all units in coke and chemical production operate normally, without breakdowns, and supply metallurgy with full value fuel. Many of these units are obsolete or obsolescent, needing relining, while considerable amounts of equipment on the remaining ones must be replaced. It is no exaggeration to say that machine builders crumple up our orders, while Slavtyazhmash, the only specialized plant, is overloaded. A weak repair base also has an effect.

The majority of these problems are the sector's and we must solve them. It is more difficult with raw materials, which are needed by coke and chemical workers not only in sufficient volumes, but also of the required quality. Although in recent years coal workers have improved their work, this has not been sufficient to satisfy all needs and to supply coke and chemical enterprises with a normal reserve for process needs. Often only 2-3 of the 4 grades of coal essential for manufacturing processes are available. This leads to frequent recharging of batteries, which at times are out of order.

It would help solve the problem if USSR Gosnab would agree to transfer to power engineering workers the coke and chemical workers' supplies of dry burning coal, with the latter receiving gas grade coals from the Kuzbass. They are equivalent with respect to heat value, but gas coals cake much better. Metallurgists would also be helped by USSR Gosplan's more precise implementation of its decisions. This year it allocated anthracite and high grade dry burning coal to replace coke in shaft ovens for lime calcination. What are we delivered? Unsorted dry burning coals, unsuited for our purposes.

So, we are forced to use for calcinating limestone the coke which is very much needed by blast furnace workers. Others do not need it, but simply use it to produce fertilizer and sugar, for the production of mineral wool and glass, for calcinating dolomite and limestone and for smelting foundry pig iron and other metals. Glavmosstroy [Main Moscow Construction] , Glavlensstroy [Main Leningrad Construction Administration] and Glavmospromstroy [Main Moscow Industrial Construction Administration] annually use 10,000 tons of coke to dry out structures after construction. This quantity of fuel could supply the famous Ninth Krivoy Rog Blast Furnace for 48 hours. During this time it could smelt 20,000 tons of high quality pig iron.

Enterprises in almost 100 ministries and departments "fight" for coke supplies and part with them very reluctantly. The conversion of the Azot Association in Kemerovo to the production of ammonia and other products through the use of gas was delayed an entire year. Glass making furnaces at plants in Novosibirsk were converted to gas only after long debates. Minmontazhspetsstroy [Ministry of Installation and Special Construction Work] and Ministroymaterial [Ministry of the Construction Materials Industry] are taking a middling course in replacing cupolas at tank furnaces.

USSR Mintsvetmet [Ministry of Nonferrous Metallurgy] enterprises annually consume large amounts of metallurgical coke. Our colleagues promise to reduce their use of this fuel. They eagerly describe the innovations in equipment and techniques which will make possible substantial reductions in coke consumption at the Irtyshskiy Polymetallic and the Ust-Kamenogorsk Lead and Zinc Combines, while at the Dal'polimetal Association they will cease using it altogether. However, what is happening? The "economizing" projects in Kazakhstan are being slowly built, while they have not even begun work on them at Dal'polymetal.

A considerable share of the blame for delivery disruptions should be directed towards specialists at GKNK [State Committee for Science and Technology]. Last year they promised to approve and present to USSR Gosplan a coordinated program of research and production development for coke briquet fuel made from poorly caking coals. In particular, by 1990 it would provide for reductions in the use of coke for pig iron castings at cupola furnaces and the smelting of ore at shaft furnaces of USSR Mintsvetmet.

The reduction of norms for the use of foundry coke in the production of pig iron castings at cupola furnaces is another problem. Enterprises at a number of machine building ministries, primarily Minavtoprom [Ministry of Automotive Industry] and Mintyazhmash [Ministry of Heavy and Transport Machine Building] are reluctantly engaged in such work. They are used to complaining about low quality coke, but do not use other types of fuel.

I remind you that dry burning foundry coal is suitable for replacing coke. The former should be supplied in large amounts by the Raspadskaya Central Enrichment Factory in Mezhdurechensk. Its introduction is planned for next year, although it will not be ready on time. Due to prolonged construction, its design became outdated and was reviewed a year ago. Now the nearest date for the enterprise's operational introduction is not before 1987. Just try to attempt reductions in the use of coke for other than blast furnace needs under such conditions!

The production and use of coke is an interdepartmental problem. As practical experience shows, the efforts of metallurgical workers alone are clearly insufficient for its solution. Increasing coke production and improving its quality are only half the problem. It is also essential to more rationally use it and where possible to replace it with other types of fuel. It goes without saying that it is necessary to stop allocating its supplies in the present sweeping manner.

11574

CSO: 1822/50



COAL

## COAL WASHBOX AT CHELYABINSKUGOL' DESCRIBED

Moscow SOTSIALISTICHESKAYA INDUSTRIYA in Russian 17 Sep 83 p 1

[Article by A. Yermakov: "The Example of Chelyabinsk"]

[Text] The excavator bucket grabs the earthy gray mass and drops it in the hopper. From there it moves along a conveyor belt to the coarse sorting point. This is the beginning of the process chain. At its end the selected coal pours off the cascade of conveyors in a bright stream.

The open pit method of coal extraction is rightly considered more efficient than the underground method. Its share of total extraction is constantly growing. In the Kuznetsk Basin it accounts for one-third of the coal extracted. True, the open pit method not only has undoubted advantages, but also has minuses. One of them is the incomplete extraction of fuel from uncovered seams. "Razubozhka", this is what the miners call the gray rock mass which for years has been thrown into the spoil banks.

The more powerful the excavator used at coal faces the greater the operating losses. Something which could be picked up with a spoon could not be with a ladle. This is also true for an excavator bucket; the larger it is the more difficult it is to remove thin seams, without having picked up a share of rock. Enrichment facilities have limited possibilities. They are not capable of processing material which is half rock. This is why such material has long been sent to spoil banks.

Miners at the Chelyabinskugol' Production Association were the first to learn how to extract fuel from such material. Their experience was acquired by the Siberians, but they added their own discoveries to it. Their planning-design office prepared documentation for the installation of a steeply inclined separator, this included blueprints. The basin's first steeply inclined separator (SIS) for coal is now ready. In addition to its technical quality, its low cost and simplicity are also attractive. L. Gudkov, the installation mechanic, explained the principles of its operation:

"Razubozhka" enters the separator from above and water enters from below. The two streams meet. The operator regulates water pressure so that it

pushes the lighter coal upwards while the rock falls below. The coal is then dewatered and the finished product can be sent to the customer."

Specialists from the Moscow Scientific Research Institute for Solid Fuel Enrichment helped the Siberians build the separator. The latter showed how to better economize on process water and gave much useful advice. However, the main load during the introduction of the new equipment was on the shoulders of the young collective of enrichment workers. The innovation was also of interest to veterans who had worked at the mine for dozens of years. Some of them were already pensioners but they did not sit at home.

Mechanic M. Lopshanov led a coal enrichment section. The former excavator brigade leaders, I. Batalov, N. Putintsev, and fitter A. Batalov worked as coal enrichment workers.

Here is how N. Grigor'yev, Director of the mine imeni 50 Years of October, and one of the initiators of the SIS's introduction evaluates the device:

"We will obtain an additional 150,000-200,000 tons of coal annually. For a mine such as ours it would seem that this is a small amount, after all this year we extracted 5 million tons. However, if one takes into consideration that operational losses reach 10 percent then the use of the SIS is a considerable reserve."

So far only two such devices are in operation, construction of a third is being completed. Already during the first testing on material with ash content above 56 percent, coal containing only 18 percent ash was obtained. Now, after enrichment workers have eliminated some shortcomings in the design and mastered the new technology ash content has reduced to 11-14 percent. This, in the opinion of specialists is not the limit.

At the same time the search for a new, more economical and efficient technical solution is continuing at the Association. One such solution will be realized on an installation being built at the Mokhovskiy mine. Here dry "razubozhka" will be fed into the enrichment facility. Thanks to this greater depth of coal extraction is attained and less process water is required. In addition the process will be cheaper.

11,574

CSO: 1822/50

## COAL

### YUZHKUZBASSUGOL' OPERATIONS, PLANS SUMMARIZED

Moscow EKONOMICHESKAYA GAZETA in Russian No 43, Oct 83 p 6

[Article by N. Manuylov, special correspondent: "Example of the Yuzhkuzbassugol' Miners"]

[Text] The Yuzhkuzbassugol' Association accounts for one-fifth of all coal extracted in the Kuznetsk Basin. The national economy annually obtains 27-30 million tons of coal from here.

Since the beginning of the Five-Year Plan the Association's collective has produced more than 1 million tons of coal in addition to the target. There are increases in above planned deliveries of coking coal necessary for metallurgy.

Socialist competition for accelerated growth in labor productivity is expanding at the mines. This year the number of brigades working with a daily loading of 1000 and more tons of coal per day increased by 8 and there are now a total of 45.

The tone in the patriotic movement for the highest output from mining equipment is being set by the brigades of Hero of Socialist Labor N. Reshetnikov, V. Bovta, and P. Donskiy from the Zyryanovskaya Mine and of Hero of Socialist Labor V. Bardyshev from the Novokuznetskaya Mine, V. Vladimirov and G. Zaytsev from the Abashevskaya Mine and a number of other collectives. What are the particular features of their experience?

For several years in a row the collective of N. Reshetnikov has been working the same seam at the second section of the Zyryanovskaya Mine with the help of a mechanized complex. Each year it sends a million tons of fuel to the surface. In 5 years labor productivity at the brigade has increased by 30 percent, this year output per worker at the working base rose an additional 5.7 percent.

As A. Pidenko, the chief economist at the mine, explained the factors in the success were the more "dense" use of working time, including all

service personnel in the staff of a single comprehensive brigade, paying labor for final results and precise engineering calculations.

The collective is gathering grains of experience and attaining high results at lowest cost. To a great extent this is because the second section in general (mining engineer V. Leonov is section chief) production outlays have been reduced by 100,000 rubles compared to last year and it now produces the cheapest coal in the basin.

Here is another example. The obligations of the comprehensive mechanized brigade at the Rapsadskaya mine, led by Hero of Socialist Labor V. Devyatko are five million tons of coal during the Five-Year Plan. This year the collective finds itself in difficult conditions. Serious mining geological complications were encountered and the threat arose that the obligation would not be met. At the mine there were discussions as to whether or not it would hurt to correct the plan on the downward side. The brigade categorically refused this way out and is exerting every effort to keep its word.

Such are the labor collectives which are leading in the competition. Their experience is widely propagandized, studied and used at mines of Yuzhkuzbassugol'. The obligations here are supported by a complex of organizational-technical measures for reducing manual labor and the most complete use of machinery.

According to plan the Association is supposed to have 70 comprehensively mechanized work bases. In actuality there are more thanks to the miners' mastering the skills of high speed assembly of equipment. In recent months ten complexes have gone into operation.

The record rightly belongs to assemblers at the Novokuznetskaya Mine, where the process of shifting complexes from one long wall to another takes 140 hours, considerably lower than the norm.

At the request of these high speed associations the centralized reserve for spare parts to various types of equipment has been created at the association. A system of improved assembly quality is being developed and innovators' proposals are being implemented.

In the last year alone more than 90 suggestions of workers and specialists have been introduced. These are directed above all towards improving labor productivity. During the same time the prime cost per ton of coal was reduced by 20.1 kopecks.

Entering the final period of the Five-Year Plan's third year, at their meeting miners' collectives are critically analyzing work results and eliminating shortcomings. It is deemed possible to produce an additional 1.7 million tons of coal above the Five-Year Plan through the more rapid reconstruction of the work front and improved loading at work bases.

There is a clear-cut program for increasing labor productivity at the Association. It is intended to increase the number of 1000 tons brigades to 46, including 17 brigades producing 500,000 and more tons of coal per year. It is planned to increase monthly extraction per miner at the work face in the time remaining until the end of the Five-Year Plan to 71.1 tons.

The Kemerovo Party Obkom approved the initiative of miners at the Yuzhkuzbassugol Association and their program for fulfilling the Five-Year Plan targets ahead of time. There is intensified mass organizational work in the basin to disseminate progressive experience to all miner collectives. It is difficult to overestimate the significance of this work for the Kuzbass: the oblast still has quite a few collectives which are lagging.

Following the Yuzhkuzbass initiative, miners working at Yuzhkuzbassugol' Oblkemerovougol' and many mines at other associations are increasing their targets.

11,574  
CSO: 1822/50

COAL

## UKRAINIAN ASSOCIATION DEVELOPS NEW METHODS OF MINE WATER CONTROL

Moscow IZVESTIYA in Russian 13 Sep 83 p2

[Article by A. Pshenichnyy, deputy minister, USSR Coal Industry, Hero of Socialist Labor, candidate of technical science: "Subduing the Earth's Interior"]

[Text] Nature herself has made water the guard of the inestimable wealth in the underground storehouses. It has long caused people many problems on the way to mastering reserves of mineral resources.

Practical experience in building mining enterprises and facilities knows of many examples where there were failures in taming groundwater.

The various special methods of driving tunnels which have been worked out by many institutes are either insufficiently effective or very labor intensive and expensive.

The comprehensive method of plugging-back waterflooded rock during the construction of mines in difficult mining geological conditions which has been developed by the UkSSR Ministry of the Coal Industry's Spetstamponazhgeologiya [Special Back-Plugging Geological] Production Association and widely introduced under the leadership of E. Kipko, the association's director and a candidate of technical sciences, has become a basic solution to the problem.

Instruments and methods have been developed which make it possible to discover all water bearing horizons and to obtain exhaustive information about their characteristics. For the first time in the world, a method has been worked out which allows direct engineering calculations of the entire complex process of isolating water bearing horizons. New, effective mud-cement plugging-back solutions have been created to form deep, reliable watertight curtains even where underground water has considerable speed of flow and high pressure. The annual savings in scarce oil well cement amount to tens of thousands of tons.

The Spetstamponazhgeologiya Association's last great achievement was the successful preliminary plugging-back of a ventilation shaft at the Mine imeni A. F. Zasyad'ko in the Donbass through a single directional well to a depth of 1,090 meters. World mine construction practice does not know of such cases.

There is also great social significance in the fact that the difficult and labor intensive work of sealing off water flows in mine workings, requiring skilled tunnel drivers, is done from the surface. Tunnel drivers' work in dry areas is done under more healthy conditions.

In general, the new method makes possible substantial reductions in the time required to sink mine shafts and reduces the labor intensity of tunnel driving work. The actual economic effect from its use already amounts to more than 100 million rubles.

The comprehensive method of plugging-back has been used on a wide scale in the construction of new and the reconstruction of many mines in the Donetsk Basin and Rostov Oblast. The method is also widely used in the driving of horizontal and inclined mine tunnels, in mine openings near shafts, the sealing off of old workings near industrial projects under construction and in the elimination of leakage in mines under construction as well as for other needs.

This comprehensive method is being used on projects not only in our ministry also in many others and in other nations: Hungary, Bulgaria and Czechoslovakia. A number of foreign countries have acquired licenses for its use.

The work of the Spetstamonazhgeologiya Association in the plugging-back of waterflooded rock was deservedly nominated for the 1983 USSR State Prize.

11574

CSO: 1822/49

## COAL

### WAYS OF IMPROVING EFFICIENCY OF MINE PREPARATION WORK IN DONBASS ANALYZED

Moscow UGOL' in Russian No 9, Sep 83 pp 7-10

[Article by A. A. Manzhula, deputy minister, Ukrainian SSR Coal Industry: "Ways of Increasing the Efficiency of Mine Preparation Work at Mines in the Ukrainian Donbass"]

[Text] The timely preparation of reserves for stoping is one of the basic conditions for the rhythmic operation of mines and for increasing coal extraction. The plan targets for workings at mines in the Ukrainian Donbass are in general being fulfilled. The total length of workings driven annually is remaining at about 2,800 km.

However, improvements in mining operations and increases in the average depth of operations have caused substantial changes in the structure of total workings. Thus, the share of cutting workings declined from 29.6 percent in 1975 to 25.4 percent in 1982, while that of opening and development workings increased by 17 percent. There was an increase in field and inclined workings. Their total annual volume during this same period increased from 19 to 21.1 million cubic meters, or by 11 percent, due to an increase (averaging 12 percent) of working cross section clearance. Working conditions have become substantially more difficult. With the increasing depth of work there have been increases in rock pressure, strength and temperature of surrounding rock and the methane content of seams. As a result of increases in working cross sections, with the height of the seams worked remaining constant, there has been a considerable rise in the coefficient of sectioning [pri-sechka] of rock. Thus, mining engineering conditions have now become substantially more difficult.

The use of new, progressive tunnelling equipment and the implementation of organizational measures have permitted somewhat of a reduction of the negative influence of more complex mining geological and engineering conditions upon the main indicators of workings. During 1981-1982 mine preparation work was improved through the introduction of progressive equipment systems, the staffing of tunnelling brigades with qualified workers, improvements in work organization and material-technical supply, the dissemination of progressive experience and the creation of high speed tunnelling brigades. The number of brigades grew from 247 in 1981 to 263 in 1982; they completed 551 and 582 km of opening and development workings..



Table 1.

Показатели Indicators	Brigade Leaders, Mine (Association)							
	В. Г. Вендилов, им. Е. Т. Абакумова («Донецк — уголь»)	Б. В. Постовой, им. Е. Т. Абакумова («Донецк — уголь»)	П. Л. Мakhнев, им. Коротченко («Селидов — уголь»)	В. А. Павлюка, «Ворошиловградская» № 1 («Ворошиловград — уголь»)	Л. Е. Кукнерик, им. Баракова («Краснодон — уголь»)	Г. Г. Дурдажи, «Терновская», («Павлоград — уголь»)	В. М. Вернигор, «Павлоградская» («Павлоград — уголь»)	А. В. Пуля, им. Ленинского комсомола Украины («Павлоград — уголь»)
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
(9) Площадь сечения выработки, м <sup>2</sup>	11,2	11,2	9,2	10,4	12,7	7,3	8,5	9,8
(10) Коэффициент крепости пород	4	4	3	2—3	4—5	2—3	2—3	2—3
(11) Коэффициент присечки пород, %	55	60	50	100	60	75	70	80
(12) Тип комбайна	GPK	GPK	GPK	4PP-2	GPK	PK-9p	PK-3p	4PP-2
(13) Проведено выработок, м	5031	4938	4306	3753	4011	4127	4243	3645
(14) Средняя производительность комбайна, м/мес	419	412	359	313	334	344	452	308
(15) Максимальная скорость проведения выработок, м/мес	730	830	607	800	505	370	601	510
(16) Численность бригады, чел.	60	54	60	66	100	40	68	73
(17) Производительность труда проходчика, м/мес	7,0	7,8	5,6	4,7	3,3	8,8	8,1	4,9

## Key:

1. V. G. Vendilovich, imeni Ye. T. Abakumov (Donetskugol')
2. B. V. Postovoy, imeni Ye. T. Abakumov (Donetskugol')
3. P. L. Makhnev, imeni Korotchenko (Selidovugol')
4. V. A. Pavlyuka, Voroshilovgradskaya No 1, (Voroshilovgradugol')
5. L. Ye. Kuknerik, imeni Barakova (Krasnodonugol')
6. G. G. Duradazhi, Ternovskaya (Pavlogradugol')
7. V. M. Vernigorov, Pavlogradskaya (Pavlogradugol')
8. A. V. Putrya, imeni Leninskiy Komsomol Ukrainy (Pavlogradugol')

9. Working cross section, m<sup>2</sup>
10. Coefficient of rock strength
11. Coefficient of rock sectioning percent
12. Type of combine
13. Workings driven, m
14. Average combine productivity (m per month)
15. Maximum speed of advance (m per month)
16. Number of workers in brigade
17. Labor productivity per tunnel driver (m per month)

High indicators were attained by the brigades of B. F. Postoviy and V. G. Vendilovich from the Mine imeni Ye. T. Abakumov in the Donetskugol' Association. With the help of a GPK combine the brigades drove seam openings with 11.2 square meter cross sections using a mixed face with a coefficient of sectioning of 55 - 60 percent. This was through rocks having a strength coefficient of  $f=3$  to 4, on Professor M. M. Protod'yakonov's scale. The brigades of V. I. Pavlov from the Mine imeni N. Isotov, Artemugol' Association, of I. V. Skryabin from the Progress Mine and of V. I. Boyko from the Miusskaya Mine, Toreantratsit Association, using the drill and blast method, attained average monthly tunnel driving speeds of 316, 292 and 290 meters respectively in 1982.

In order to disseminate the work experiences of high speed tunnelling brigades, in 1982 there were 9 schools of progressive experience for teaching such work methods to leaders of preparatory sections, brigade leaders and machine operators.

At mines in the majority of associations the drill and blast method is the main way of driving preparatory workings. Combines are used on opening and development workings with mixed faces and rock sectioning of  $f \leq 6$ , and on coal, primarily cutting, workings.

The mechanization of tunnelling work is still not completed. Thus, for the drill and blast method only the drilling of shot holes has been completely mechanized; rock loading is 78 percent mechanized. Loading at cutting workings is 35 - 38 percent mechanized. This is due to the lack of the appropriate equipment, the development of which should become a first priority task for planning design organizations.

The installation of permanent supports is the most labor intensive process both in the drill and blast and combine methods. Existing support installation equipment permits only the partial mechanization of support work and is not yet widely used.

Since 1975 there have been significant changes in the stock and structure of the basic tunnelling equipment. There has been a 11.7 percent increase in the number of loading machines. This is due to the introduction of crawler mounted continuous miners, providing for a practically unlimited loading front and having higher productivity. There was a 73 percent increase in drills and a 2.3 fold growth in tunnelling and cutting combines, mainly GPK, 4PP-2 and KN machines. As a result, the level of combine tunnelling increased to 26 percent and volumes almost doubled. Levels are highest at mines in the Pavlogradugol' Association (93 percent), in Dobropol'yeugol' (76 percent), Krasnoarmeyskugol' (61 percent) and others.

At present more than 80 percent of total workings volume is still handled by light type combines (GPK, PK-3r, 4PU) and cutters (KN type). However, the rational region for their use has been mined out. They are frequently used in more difficult conditions not appropriate to their technical characteristics.

Only the use of heavier types and cutting combines will make it possible to increase the level of combine operations. This requires increasing the

deliveries of 4PP-1, (4PP-2m) and KN combines, accelerating the production of the GPK-2, 4PP-5 and PK-200 heavy duty tunnelling combines with selective action, KRT type combines and Soyuz-19 tunnelling complexes, intended respectively for digging one and two track mainline field tunnels.

Let us note that there is a tendency towards decline in the productivity of tunnelling combines and loading machines. This is caused by increases in the average cross section of workings and in the sectioning coefficient of rock. At present the average cross section driven by combines has increased by 11.3 percent. The percentage of workings driven by 4PP-2 combines, with sectioning up to 75 percent of the rock, has reached 16 percent, compared to 1.3 percent in 1975.

The following is planned to substantially increase the technical standards of mine preparation work:

Improve mining operations and introduce progressive technological systems;

The rational use of the available stock of basic tunnelling equipment through the improvement of work organization at faces and reductions in the time required for the installation, dismantling and repair of this equipment;

Equip development faces with suspended cable haulageways, support installation equipment and telescoping conveyors;

Increase the level of combine working through improvements in the use of 4PP-2 (4PP-2m) tunnelling combines and KN cutting combines as well as through increases in their numbers;

Develop and introduce mobile equipment for the mechanization of work on shorter tunnels with small cross sections. The amount of such work averages 60 km annually;

More widely disseminate the work experiences of progressive brigades attaining high indicators.

One factor for improving mine preparation work indicators is to increase further the volumes of preparatory operations in which rock is left in the mine, as the stacking of protective banks of broken rock eliminates labor outlays for sending it up, releases human reserves and means of transport, and considerably reduces expenditures for maintenance. A certain amount of work in this direction has been done at mines in the Ukrainian Donbass. To replace multi-operation and labor intensive filling with the use of scrapers, 35 Titan-1 crushing-filling complexes have been introduced. In 1982 they were used on about 10 km of tunnels; more than 152,000 m<sup>3</sup> of rock was left in the mines. It is intended to double the number of such complexes by the end of the 11th Five-Year Plan.

The introduction of the Titan-1 complexes made possible the paired workings of coal by one face with the filling in of the excavated block between them. For example, in 1982 the Mine imeni M. Gor'kiy, Donetskugol' Association, used

existing series produced mucking and tunnelling equipment in seam h<sub>10</sub> to drive more than 500 meters of twin entries. Byproduct output of coal from moving the face 1.6 - 2 meters was 140 - 180 tons per day. However, the technology for such twin entries requires great labor outlays for driving advance cross adits, cutting niches and supporting braces in the rock bank dumping zone.

DonUGI [Donets Scientific Research Institute of Coal], Dongiprouglemash [Donets State Planning Institute for Coal Machinery] and a number of other organizations are working on improvements in technology and on the creation of mechanized equipment for twin entries on gently dipping seams 0.6 - 2 meters thick. The KSV-1 complex for driving twin entries and leaving rock behind has been tested at the Mine imeni A. G. Stakhanov, Krasnoarmeyskugol' Association and the Yuzhnodonbasskaya No 1, Donetskugol' Association. There has also been experimental development of technology for the auger extraction of inter-drift blocks and auger filling of rock from twin entries at the Mospinskaya Mine, Donetskugol' Association. This work has made it possible to determine the principle directions in solving the problem of leaving rock in the mine when driving tunnels. This problem requires a comprehensive solution, with the participation of scientific research, planning-design institutes and coal machinery building plants.

Due to the ever increasing depth of mine operations, problems of support and protection are acquiring special urgency at mines in the Ukrainian Donbass. The complication of maintenance conditions is a consequence of increasing rock pressure, changes in rock physico-mechanical properties, and high temperatures and water content.

The distance of workings maintained at Donbass mines is steadily increasing and has now reached 15,000 km. In spite of the extensive material and human resources expended on their repair and upkeep, the total distance of workings not meeting the technical operating rules amounts to 16 percent of gently dipping seams and 30 percent of steeply dipping ones. In recent years the maintenance problem has been solved through improvements in mine operation layouts and development systems, increases in working cross sections and in the use of efficient supports, and an expansion in the volume of pillar-free methods of protection.

A number of deep mines are successfully conducting overhead working (relieving) of mainline drifts and inclined workings by using special relief longwalls. Unfortunately, this effective method has so far been insufficiently implemented, as the present practices of building mines and new horizons do not make provisions for relief longwalls. Therefore 90 percent of inclined workings and mainline drifts in the Donbass are supported by coal block panels up to 300 meters wide.

The basic direction for mining improvements at UkSSR Ministry of the Coal Industry mines is expanded use of pillar-free techniques through repeated use of entries or by driving them transversely to the worked out space. At the present time this process is used to work about 40 percent of extraction sections at seams lying at angles of up to 35 degrees. Up to 60 percent of the longwalls are worked through repeated use of entries.

However, further expansion of pillar-free technology with repeated use of entries and narrow faces to pass through rock gaps [puchashchim porodam], characteristic of mines in the Donbass, is ineffective, especially with the progressive column system of working, because of the large volumes of manual labor in resupporting workings and undermining footwalls, the lack of effective means of delivering materials and moving rock along such passageways, and bad ventilation. Improvements in this technology should be directed towards using KSV complexes to prepare columns and towards developing methods and machinery for maintaining workings.

In deep mines effective measures for increasing interrepair periods require making allowances for rock settling and the use of props with increased pliability. Metal arch pliable SVP special profile supports are the most (76 percent) used in the Donbass. Supports with modernized lock joints -- the arched 5 link AP-5 and the trapezoidal KPS with structural pliability of 1,000 mm and 1,200 mm respectively, have been developed and introduced at workings in gently dipping seams. Thanks to sizable cross section allowances for rock settling, the use of these supports makes possible substantial improvements in tunnel conditions and a 3,000 - 5,000 man-shift reduction in support resetting and general support work per 1 km of tunnel. The installation of KPS supports can be easily mechanized, the head of the main conveyor placed in the drift and and support of the drift longwall junction simplified. Total length of AP-5 support application is 50 - 70 km annually, and for KPS supports 20 km annually.. In the long term the figures might reach 300 - 400 km and 100 - 200 km per year respectively.

Development work is being completed on standardized supports for drifts in steeply dipping seams. These supports have a design pliability of 1,000 mm in the predominant direction of rock movement. According to preliminary data their use will reduce the labor intensity of support by/to 20,000 - 30,000 man-shifts per 1 km and save 20,000 rubles. Special low-alloy steel has been developed. Its use will reduce support mass by 14 - 19 percent.

Anchor supports of the existing design can be used independently or in combination with retaining wall supports on a total of 200 km annually. This could be increased to 280 km annually if high productivity machinery for their installation in such rock were developed and introduced. Further expansions in the use of this type of support will become possible after the development and mass production of anchor supports with carrying capacity of 200 - 250 and more kN.

Further growth in the use of effective supports is delayed by insufficient production capacity at mine repair plants and the failure of UkSSR Ministry of Ferrous Metallurgy plants to meet targets for supplying special profile low alloy supports to coal miners. In addition, there are still unsolved problems in the manufacture of metal supports by the hot roll forming method with the simultaneous bending of the arch at specialized enterprises.

Pillar-free stoping is developing through methods of protection such as rock banks, ferroconcrete blocks and wooden structures (combinations of chocks made out of ties with reinforcements). The expanded use of rock banks will make it more possible to mechanize their installation with Titan complexes and ZU

type stacking units. The insufficient use of ferroconcrete blocks for tunnel support is due to the lack of equipment for mechanizing their installation. In spite of the shortage of timbers and the use of manual labor in erecting chocks, stulls and facings, their use to support workings at great depth is more effective than coal pillars.

"Energokompleks", a republic, goal directed scientific-technical program has been developed to solve the most important problems of the coal industry in the 11th Five-Year Plan. This program provides for the creation of more productive equipment and processes used in driving preparatory workings, and of reliable equipment and rock-breaking tools for underground work.

A set of measures has been developed to eliminate bottlenecks in elements of the technological processes, to improve mining operations and mine development. It is intended to increase the productivity of intramine transportation and hoisting equipment and surface complexes and to introduce and disseminate progressive production experience.

The implementation of the "Energokompleks" program and the measures planned by minewill make possible the more effective use of tunnel driving equipment, considerably expand the comprehensive mechanization of work, increase the use of combines to 32 percent of all tunnel driving work and improve other techno-economic indicators.

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## COAL

### NEW EXCAVATION EQUIPMENT FOR EKIBASTUZ

Alma-Ata NARODNOYE KHOZYAYSTVO KAZAKHSTANA in Russian No 8, Aug 83 pp 65-66

[Article by N. Mozhin, chief engineer, Kazmontazhproyekt Institute, secretary, scientific-technical council; V. Senin, head of institute department and L. Syrovchev, chief engineer of institute project: "Guarantee of Success in Good Preparation"]

[Text] Coal mined at the Tsentral'nyy and Bogatyr' open pit mines now operating at Ekibastuz using rotary walking excavation machines is loaded immediately into railroad cars. This process creates an awkward transportation system and idles high-capacity coal mining systems for substantial periods of time.

What is more, the coal seams being worked are not of uniform compositional quality. With the mining processes currently being employed, our electric power plants are receiving fuel which varies greatly in heating capacity, ash content and other parameters, which creates no small difficulty for power engineers. Plans accordingly call for a fundamentally new fuel extraction process to be introduced at the Vostochnyy mine, which is scheduled to be brought on stream during the Eleventh Five-Year Plan period.

Coal seams will now be worked by SRS(K)-2000 rotary excavation machines and the coal fed to a processing facility on the surface via interbench reloaders and a system of mobile and stationary conveyors.

The processing facility consists of a series of reloading points, which by means of a system of conveyors permit the flow of coal to be sent on directly for loading or distributed among four coal-blending storage facilities. The latter are equipped with drum-type blending and loading and coal piling machines. The introduction of coal blending capacities to the overall processing system will make it possible to provide electric power plants with fuel having stable parameters.

Plans call for coal to be loaded into the railroad cars via two loading points equipped with special dispensing machines. The processing system includes a group boiler unit comprising 8 KE-25-14C boilers.

Organizations of the Kazakh SSR Minmontazhspetsstroy [Ministry of Installation and Special Construction Work] have been put in charge of installation operations at the Vostochnyy mine. This is a very important undertaking. Questions concerning the organization of these operations at the mine were accordingly made the

focus of a special meeting of the plenum of the ministry's scientific-technical council. Detailed discussion of questions concerning the organization of installation operations at the mine was particularly important in view of the fact that 1983-1984 plans call for sharp increases in the amount of construction and installation work to be done at the Ekibastuz fuel and power complex, the absence of corresponding installation organization capacities notwithstanding.

The first phase of a machinery-installation program alone is to be implemented at a cost of 6,036,000 rubles. The second phase is to run 3,122,000 rubles. Plans call for 41,000 tons of machinery to be installed at the mine, to include 21,800 tons of mining equipment and 15,900 tons of belt conveyors.

Considerable work is also to be done in the way of putting up structures, electrical installation etc. Plans also call for ministry organizations to work on the Porodnaya railroad station and a number of other facilities at Ekibastuz.

Practical experience has shown that the end result of a construction project will to a great extent depend upon the level of engineering preparation a facility makes and the thoroughness of the preliminary studies done on all other questions concerning the project. How preparations like this are being undertaken can be illustrated by the following examples.

The Kazpromtekhmontazk trust has been placed in charge of machinery installation at the complex, while the Kazstal'montazh trust is responsible for structural work. Together with the Kazmontazhproyekt Institute of Planning, Design and Technology, organizations of these trusts went to work on the development of the design and engineering documentation, identified the bottlenecks and developed a program of measures insuring that the work planned would actually be accomplished.

As was pointed out above, the coal seams in this mine are going to be worked by SRS(K)-2000 rotary excavation machines supplied by the GDR. Specialists from our ministry have the task of installing five of these machines, which will have a capacity of 3000 m<sup>3</sup> an hour. To give the reader some idea of the challenge involved in this task, suffice it to tell him that with its loading boom this type of excavating machine is 80 m long, 32 m wide and 40 m high and weighs 2698 tons. It will normally take 16 months to assemble only one of these monsters.

The Kazpromtekhmontazh trust has already accumulated some fund of practical experience in putting in and assembling the SRS(K)-2000 excavator. Several of them have already been built at the Bogatyr' mine. In accordance with a Kazpromtekhmontazh institute plan, the work was done by large units in a special assembly area located at the edge of the mine.

This operation required the pouring of a concrete cover over the work area and the erection of three heavy-duty BK-1000 cranes whose reach can encompass the entire area. It was provided with permanent electric power and compressed air supply lines as well as storage and service facilities. Three standard-gauge rail lines were laid to bring in structural components and assemblies.

To make it possible to inspect arriving equipment and to carry on these construction operations in the severe climatic conditions of Ekibastuz over the period of an entire year, construction was begun on a shop in which the larger components of the excavation machines would be assembled. This important piece of preparatory work is now being completed.



It has now been decided to use the construction area at the Bogatyr' mine with its shop for mounting preassembled components to help speed up the assembly of heavy equipment for the Vostochnyy mine. This area will now be used to build SRS(K)-2000 rotary excavation machines, interbench loaders and drive stations for mobile conveyors and cable transports. Upon the completion of construction operations, these machines will be moved under their own power over a special road to their working area.

A 100x100 m construction area is also being prepared in the Vostochnyy mine itself near the coal storage facilities and customer equipment storage areas. It is planned to use this area to assemble large preassembled components of the face and main conveyor systems. Final assembly of these large components will be done at work positions on temporary assembly sites.

At loading and reloading sites plans call first of all for assembly of the lifting equipment—bridge cranes and jibs—which will then be used to mount and assemble the larger components of equipment for the complex.

It has been decided in principle to proceed with the construction of boiler and loading facilities, which provides for combined assembly of both metal structural and equipment components.

Clearly understanding the challenge involved in these tasks, specialists of organizations under the jurisdiction of the Kazakh SSR Ministry of Installation and Special Construction Work are now single-mindedly engaged in the essential preparatory work entailed. There remain, however, no few problems which ministerial organizations will be unable to resolve on their own.

The productive capacities of the first phase of the Vostochnyy mine complex are scheduled to come on line in 1984. The customer, however, in the person of the Ekibastuzgol' production association has yet to turn over a substantial part of the planning estimates. Among other things, problems involved in arranging for the delivery of special imported assembly equipment have yet to be resolved, which is making a great number of operations considerably more difficult.

Nor has the customer transferred funds for the rolled metal products (some 2000 tons) required to fabricate the metal structures. The republic Minmontazhspetsstroy is unable to make up this shortfall from its own internal resources.

The problem of readying the assembly site at the Vostochnyy mine also remains to be resolved; the facilities can not yet be considered adequately prepared from the structural point of view, nor have proper work arrangements been made for the construction and assembly organizations.

General contractor organizations are doing only the null-cycle work on the boiler.

In the plan governing the organization of construction operations, the general contractor has not yet resolved the problem of targeted allocations of essential capital investment to organizations of the Kazakh SSR Minmontazhspetsstroy to support the development of an industrial base for the construction organizations and to build the housing and provide the personal services required to accommodate the sharp increase in manpower involved.

These and a number of other factors are considerably complicating the efforts of the construction organizations working on the Vostochnyy mine project and threatening to disrupt progress toward the fulfillment of plan targets.

Members of the scientific-technical council have approved a technical policy for republic Minmontazhspestroy organizations which governs their involvement in construction and assembly operations at the Vostochnyy mine and have defined requirements to be met by other organizations working on the project with the objective of insuring that these new capacities are brought on stream on schedule. The decisive factor will now be the purposefulness with which all project participants strive toward the accomplishment of the desired end result.

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## COAL

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### PROSPECTS FOR IMPROVEMENTS IN MINE PREPARATION OPERATIONS OUTLINED

Moscow UGOL' in Russian No 9, Sep 83 pp 3-6

[Article by V. D. Nikitin, first deputy minister, USSR Coal Industry: "Conditions and Prospects for Improving the Techno-Economic Level of Mine Preparation Work"]

[Text] In 1981 the CPSU Central Committee and the USSR Council of Ministers passed a series of decrees which outlined measures for accelerating the technical modernization of mines in the USSR Ministry of the Coal Industry, the improvement of working conditions, increased wages and salaries for workers and employees in the sector. These fundamental documents determined the directions for further developments in coal extraction and processing. They link together problems of improving production efficiency and material stimulation of workers.

In implementing party and government decisions, in 1982 the sector's miners extracted 4 million tons of coal above the plan. This includes 800,000 tons in the Donets Basin, 500,000 tons in the Kuznetsk Basin, 700,000 in the Karaganda Basin and 400,000 tons in the Pechora Basin.

In order to further increase coal extraction by the underground method, USSR Minugleprom [Ministry of the Coal Industry] places great importance upon improvements in its techno-economic levels through better mine operations, the use of progressive methods for preparing mine fields and development systems, and the introduction of highly productive processes and equipment.

Special attention is being given to mine preparation work -- a most important link in the process of underground extraction, determining not only the condition but also the prospects for its development. As a result of the measures taken, in recent years it has been possible to stop the decline in the rates of opening and development workings. In 1982 the volume of mine workings increased by 60 km and definite technical progress was achieved in mine preparation work, mainly through the use of combine technology.

Combines drove 2,042 km of tunnels, or 39 percent of all such work requiring rock loading. The combine fleet at mines exceeds 1,900 units.

The 10th Five-Year Plan saw the creation and introduction of new designs of GPKS type combines for driving tunnels through coal and mixed faces with rock having strength coefficients of up to  $f=4$  on Professor M. M. Protod'yakonov's scale, with cross sections from 5 to 15 m<sup>2</sup> and inclines of + 18 to -25 degrees.

Creating heavy type (4PP-2) combines has expanded the use area of combine technology in rocks with strength coefficients up to  $f=6$  with cross sections up to 24 m<sup>2</sup>. These combines alone can drive 2,500 - 2,600 km annually.

There have been successful tests of the Soyuz and KRT rotary type tunnel driving combines with a rock bit. These machines make possible flow line technology with few operations through rock with  $f=8$  to 10. There have also been tests of heavy (4PP-5) and cutting (KN-78) combines, capable of increasing tunnel driving by 500 km annually.

Drill and blast technology has been improved by the use of 1PNB-2 and 2PNB-2 continuous loaders, and by BUE type electric drills, considerably reducing the labor intensity of tunnel driving and increasing its rate of advance.

The industrial introduction of the following has begun: the KPM-8 prop installer, the LTP-80 telescopic conveyor for tunnel driving and the DMK monorail.

There have been improvements in the fleet structure of the basic tunnel driving equipment: the share of GPKS and 4PP-2 combines increased from 5.8 percent in 1975 to 68.2 percent in 1982, that of 1PNB-2 and 2PNB-2 loaders from 32.3 to 38.8 percent and the number of drilling units from 721 to 1,280.

New designs for increased carrying capacity supports have been developed: four element arch and trapezoidal with cam units for pliability, an assortment with wedge locks for the Moscow basin, DonUGI designs with improved pliability units, and NIIOGR [Possibly: Scientific Research Institute for the Organization of Mining Operations] designs with strengthened bolt locks. Progressive pillar-free support methods have become more widely used and there have been increases in the repeated use of entries. There have been sizable increases in deliveries of special shaped steel to miners. This makes it possible to use metal to support up to 2,500 km of workings annually. The total distance of workings supported by progressive types of supports was 80 percent in 1982 compared to 58 percent in 1970.

At the same time the amount and condition of tunnel driving operations at many mines does not ensure the timely reproduction of the working front. This is one of the main reasons for the strained coal extraction work.

The rates of technical modernization in preparatory work and the standards of organization and technology for driving and support work do not meet production requirements and the ever more complex conditions of development work. In 1982 average mine depth in the sector reached 480 m (compared to 415 m in 1975), and maximum depth was 1,315 m. At 73 mines coal was extracted from depths of 800 m and more. Of 643 mines 394 are in the super and IIIrd categories of gas abundance. All this has led to an increase in the share of workings driven through seams and rocks where there is a danger of explosion, of the amount of surrounding rock cross sectioning and of field and inclined workings. Due to the increase in cross section and the use of heavy special shaped supports there has been a 15 percent increase in support work metal intensity. According to estimates of scientific-research institutes, the more complex conditions of tunnelling operations is causing a 1.5 - 2 percent annual increase in the labor intensity of mine preparation work. This has not been given sufficient

attention by sector institutes during the improvement of existing and the development of new technology. Scientific-technical progress in mine preparation operations has not compensated for increases in its labor intensity.

In recent years there has been a slowdown in the rates of technical modernization in mine preparation work. While during the 9th Five-Year the average annual growth in combine driving was 9 percent, in the 10th it was only 3 percent. During this latter plan labor productivity of mine preparation workers declined by 16 percent and the average rate of tunnel driving remained at 65 m per month. Substantial measures should be taken so as to ensure stable growth in the amounts and rates of tunnel driving during the 11th Five-Year Plan and to improve tunnel drivers' labor productivity. Above all it is essential to improve equipment, techniques and organization in mine preparation work and maximize combine tunnel driving.

Practical experience shows that when such combines are used the rate of driving is 2.5 fold higher than the sector average and labor productivity 1.5 fold higher. The decline in the growth rate of combine tunnelling is due to the fact that the light type (primarily GPKS) combines produced by plants of the VPO Soyuzuglemash are now being used in conditions not corresponding to their rated characteristics. This has an effect upon the results attained.

According to data from the IGD [Mining Institute] imeni A. A. Skochinskiy, only about 800 km of the annual amount of tunnelling correspond to the rated characteristics of these combines (cross sections of 5 - 15 m<sup>2</sup> unfinished driven through coal and mixed faces with sectioning up to 40 percent and rock strength  $f \leq 4$ ). The potential amount of tunneling (mixed faces with sectioning up to 70 percent, strength coefficients up to 5 and low abrasibility) is 1,830 km. In 1982 alone combines of this type drove 1,835 km. The heavy type (4PP-2) tunnel driving combines produced by USSR Mintyazhmash's machine building plant in Yasinovataya are arriving at mines in only limited amounts (about 50 percent of requirements). The TsNIIpodzemmach [Central Scientific Research Institute for Underground Machinery] and the Machine Building Plant imeni S.M. Kirov in Kopeysk are not meeting deadlines for the production of GPK-2 heavy type combines. In order to increase the level of combine driving, scientific research institutes and the VPO Soyuzuglemash must accelerate the final development and series production introduction of the GPK-2 and 4PP-5 combines and of the rotor type combine (KRT). The production of GPK-2 combines must be increased to 50 machines annually by the end of the 11th Five-Year Plan. The share of heavy combines should grow to 20 percent of total deliveries in 1985 compared to 10 percent in 1981. Combine techniques should be used in tunnels with cross sections up to 30 m<sup>2</sup> and in rock of up to  $f = 6 - 7$ . If the expanded use of cutting combines is included, the level of combine techniques can be increased to 43 percent by 1985 and up to 50 percent in the long term.

In recent years mines have received sufficient quantities of the basic equipment for tunnel driving by the drill and blast method (loaders and drills), however, the assortment does not meet the sector's requirements. The production of two arm BUE type drill units with electric drive has not been organized. Their operational productivity could ensure the required rates for driving large cross section tunnels. There are insufficient production levels of 2PNB-2 machines, which are effective in loading strong rock. Neither are there enough

2PNB-2B drill-loaders, 1PNB-2u and PPM-4u machines for operations on inclined workings. The VPO Soyuzuglemash should take additional measures to improve the structure of the tunneling equipment being manufactured.

In the modernization of existing and the creation of new driving equipment special attention must be given to the quality of manufacturing and design decisions of various components (hydraulic systems, electrical starters ).

The mechanization of support emplacement and auxiliary work, which account for up to 65 percent of total labor outlays, is a basic reserve for improving the labor productivity of workers in both combine and drilling and blasting operations. The equipment for putting up supports now being produced and created provides only for the mechanization of individual operations and is not comprehensively linked to the overall tunnel driving process. Supports are designed without consideration of the possibility of mechanization. In addition, accessory equipment (support installers, units for drilling anchor bolt holes, LTP-80 telescoping tunnelling conveyors, and DMK monorails) is manufactured in limited quantities). Machine builders in the sector should take measures to meet enterprises' requirements for such equipment by 1985 in volumes foreseen by technical modernization plans. They should also work out organizational forms for its full-set delivery and utilization.

It should be stressed that the use of heavy type combines, the full-set delivery and use of equipment and methods for mechanizing support and auxiliary work create conditions for driving tunnels with increased cross sections. The most rational cross section, with clearances, for extraction drifts in USSR Minugleprom mines is 12 m<sup>2</sup> after settling. Such a cross section satisfies requirements for non-niche stoping with longwalls, the repeated use of entries with pillar-free support and has the dimensions needed for conveyors and ventilation. However, in 1982 only about 8 percent of opening and development workings had this cross section.

It has become necessary at mines to implement organizational measures to improve the use of available equipment. The sector's basic tunnel driving equipment is operated unsatisfactorily. For example, tunnel driving combines work an average of 19.4 days a month and loaders work 14.7 days. Intrashift idle time at combine faces is 18 percent of shifts. The main causes of this are equipment breakdowns (6.1 percent), unsatisfactory transport work (4.8 percent) and organizational reasons (3.6 percent). Tunnel driving combine capital repairs are unjustifiably long ( an average of 89.3 days, with a norm of 37).

The situation is explained above all by the use of mining equipment in conditions not corresponding to its technical characteristics, the insufficient quality and reliability of tunnel driving equipment, the failure to completely meet mines' requirements for spare parts and highly productive equipment for work in difficult mining geological conditions and the incomplete staffing of specialized brigades for equipment assembly and disassembly and the operational introduction of new faces.

The work experience of high speed tunnel driving brigades is evidence of large reserves for improving mine preparation work techno-economic indicators. In 1982

there were 558 such brigades at mines. They drove 1,536 km of tunnels (24.5 percent of the work done using the mines' own resources). They had an average speed of 230 m per month, more than 1.5 fold greater than similar indicators for all remaining brigades. Good results were attained at mines such as the Sotsialisticheskiy Donbass in Donetsk, the Abashevskaya and Kapital'naya in the Kuzbass and at many others.

Main engineers at associations and mines should give special attention to improvements in the organization of mine preparation work. Tunnel drivers should not be diverted to extraneous work. Equipment delivered to preparatory faces should strictly correspond to technological plans and systems. Specialized brigades should be made up for the effective use of modern combines. A tunnel driving link should consist of at least 6 - 7 people and not drive 100 - 150 m per month, as is presently the case, but at least 200 - 250 m per month.

Radical changes are required in the technology and organization of work on improving the condition of mine workings. In spite of new proposals for bettering their protection and support and increases in the percentage of non-timber supports, their condition continues to deteriorate. By 1982 the total length of defective workings was 3,088 km (10.1 percent). This includes a 14.8 percent defect rate at the UkSSR Minugleprom and 33 and 36.3 percent respectively at the Artemugol' and Ordzhonikidzeugol' Associations.

Conditions are especially unsatisfactory at workings adjoining working faces and protected by pillar-free methods. To some degree this is explained by more difficult mining geological conditions, especially increased workings depth. In addition, many mines still do not have sufficiently high levels of engineering work on problems involving the laying, protection and support of workings. Often cross sections with reduced height are designed, not taking expected rock displacement into consideration through the essential allowances. Supports with low carrying capacity and pliability and inefficient and labor intensive methods of protection (rock banks, stulls, etc.) are used. There is not enough use of metal reinforcement posts.

The IGD imeni A. A. Skochinskiy, VNIMI, DonUGI, NPO UGlemekhanizatsiya and other sectorial institutes are slowly working on the creation, and production associations on the introduction of new supports and equipment for their emplacement, mechanized methods for filling in supported spaces, for erecting protective installations and for the chemical strengthening of rock. Plants at the VPO Soyuzuglemash, NPO Uglemekhanizatsiya and mine repair plants are not fulfilling plan targets for the manufacture of new supports, pliability components, reinforcement posts and support installers.

To improve tunnel conditions, especially at great depths, it is above all essential to effectively utilize the metal allocated. It was planned to increase metal stocks from 950,000 tons in 1981 to 1,250,000 tons in 1985. These resources can be increased an additional 400,000 - 500,000 tons annually by the repeated use of metal in accordance with the norms approved by USSR Minugleprom. This would result in the practically complete satisfaction of the sector's needs for metal supports. However, established targets for the repeated use of metal are not being satisfactorily fulfilled: in 1982 the figure was 85 percent

for the UkSSR Minugleprom and 95 percent for the Vorkutaugol' Association. The repeated use of metal has been very poorly organized at mines in the Moscow Basin, the Primorskugol' Association and others.

In a number of cases support removal and rebuilding is not supplied with equipment. It is also necessary to improve the use of metal supports and above all to conserve metal through high quality support, the conversion to rational systems for support emplacement, standard ratings for supports in pillar-free preparation work and the organization of the manufacture of new type supports with increased resistance and pliability.

Among the ways of improving the protection and support of tunnels, and consequently of conserving metal, are the filling in of supported spaces and the laying of rigid banks of anhydrite and phosphogypsum. UkSSR Minugleprom, sector scientific research institutes and Donbass associations should give special attention to the solution of this problem.

These problems have been examined with consideration given to the first priority importance of improving technical and organizational standards of mine preparation work in order to realize the basic directions of coal industry technical development within the framework of the five-year plan for improving the sector's technical standards. They have been delineated in a goal directed comprehensive program. The task of scientific research institutes, associations and plants in coal machinery building is to precisely organize the fulfillment of all the targets in this program.

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COAL

## NEW CONVEYOR UNDER CONSTRUCTION AT KANSK-ACHINSK

Moscow GUDOK in Russian 12 Oct 83 p 2

[Article by Yu. Vakhrin, correspondent: "A Conveyor Instead of a Train"]

[Text] Our country's first mainline conveyor is being installed at the Kansk-Achinsk Fuel and Energy Complex [KATEK] to link the Berezovskiy Strip Mine with the KATEK GRES.

Usually coal is hauled by train to thermal power plants. However, the Berezovskaya GRES-1 will require so much fuel -- up to 100,000 tons daily and the old method would need a huge number of railroad cars or large capacity dump trucks. Therefore the plant's design includes a different, more progressive technology. It is based on the conveyor method of freight transportation. This ensures the flow line extraction of coal by continuously operating machinery and its nonstop delivery to the plant.

The board of directors at the Krasnoyarskugol' Association's strip mines now under construction reported that the total length of the two line conveyor will be about 15 kilometers. The belts, which are 2 to 2.5 meters wide, are made of a special rubber and cable material. They will move at more than four meters per second. They will be covered by a closed gallery 8-8.5 meters above the ground on ferroconcrete supports.

Designers applied a number of new, interesting solutions in the conveyor's plans. For example, there was the difficult problem of how to put the giant into motion. This required the creation of special powerful drives and belt pulling stations at each of the five sections which are 3 kilometers long each. Tens of thousands of rollers are being made from high strength, increased wear resistant steel. Both the upper and lower sides of the conveyor will rest on them.

The basic equipment for the unusual line is being delivered to the site by machine builders in Kramatorsk, Donetsk, Leningrad and other cities in the nation. Railroaders have already delivered the first groups of equipment to KATEK. Assembly work has begun, using the flow line, large block method.

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## COAL

### BRIEFS

MAGADAN MINE--The collective at the Beringovskaya Mine in the Severovostokugol' Association is celebrating the October holiday with a labor victory: it completed the three year plan for coal extraction. Since the five-year plan's beginning it has brought more than 1.8 million tons of coal to the surface. It is for good reason that the Beringovskaya collective has been called a collective of communist labor. They not only work excellently here, but are capable of seeing the long term. In the immediate future work will begin on the mine' reconstruction, making it possible to annually extract at least 650,000 tons of coal. The collectives of mucking and tunnelling brigades are converting to khozraschet. They have posed the task of extracting 1,000 and more tons of coal daily. [By V. Zhurba] [Text] [Moscow SOTSIALISTICHESKAYA INDUSTRIYA in Russian 5 Nov 83 p 1] 11574

ABOVE PLAN COAL--Neryungri (Yakutsk ASSR) Decorated with pictures, a railroad consist full of above plan coal extracted during the October Watch by miners at the Neryungri Mine moved along the rails of the Little BAM. Engaged in socialist competition in honor of the 66th Anniversary of October, on the eve of the holiday miners completed the targets for three years of the five-year plan. During this time the Siberians sent customers more than 11 million tons of coal. [Text] [Moscow SOTSIALISTICHESKAYA INDUSTRIYA in Russian 7 Nov 83 p 1] 11574

VOROSHILOVGRAD MINERS--Miners at the Mine imeni Ya. M. Sverdlov, Sverdlov-antratsit Production Association, were ahead of time in fulfilling the plan for three years of the five-year plan. In 2 years 9 months they sent up 2.4 million tons of coal, including 225,000 tons in addition to the plan. The labor productivity plan was 108.3 percent fulfilled and 1.5 million rubles were saved through reductions in coal prime cost. [By V. Mikhaylichenko] [Text] [Moscow SOTSIALISTICHESKAYA INDUSTRIYA in Russian 9 Oct 83 p 1] 11574

MINE CONSTRUCTION-- Donetsk-- Ahead of schedule by two months, electric locomotive traffic has begun in the deep horizons of the Mine No 3 being built in Southern Donbass. The startup of the underground haulage lines has made it possible for builders to expand the work front. With the operational introduction of the enterprise, the new coal region, created on the basis of recently discovered deposits, will increase fuel extraction more than two fold. [Text] [Moscow SEL'SKAYA ZHIZN' in Russian 5 Oct 83 p 1] 11574

ZHITOMIR MINE--The commercial development of a brown coal deposit in Zhitomir Oblast has begun. The strip mine will annually produce 500,000 tons of high calorific value coal. [Text] [Moscow EKONOMICHESKAYA GAZETA in Russian No 39, Sep 83 p 3] 11574

DONBASS PRODUCTIVITY--Miners at the Mine imeni Gor'kiy, Donetskugol' Association, achieved the highest labor productivity growth in the Donbass.. The increase over this indicator's target since the beginning of the year is 24 percent. This has enabled the progressive collective to be ahead of time in fulfilling the main annual obligation: it has extracted 185,000 tons of fuel above the plan. [Text] [Moscow EKONOMICHESKAYA GAZETA in Russian No 40, Oct 83 p 3] 11574

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CSO: 1822/49

PEAT'S ROLE IN BUILDING UP PEATY REGIONS NEEDS GREATER STUDY, PLANNING

Moscow TORFYANAYA PROMYSHLENNOST' in Russian No 10, Oct 83 pp 2-4

[Article by V. N. Kolesin of the Engineering Administration of RSFSR Mintoprom [Ministry of Fuel Industry], V. D. Markov of RSFSR Mingeo [Ministry of Geology] and A. S. Olenin of Torfgeologiya [Peat Geological Operations Association]: "The Role of Peat's Potential in Developing the Productive Forces of Peat-Bearing Regions"]

[Text] Problems of the integrated use of the country's natural resources are being studied, and they are being reflected in regional technical and scientific-research programs. However, as the press has noted, "...a precise theoretical basis has not been drawn up yet for the regional aspect of scientific and technical policy. Systematic research in this area still is not being performed, and the corresponding project themes have not been represented adequately in plans of the country's economic institutes. The mechanism for controlling scientific and technical progress from the regional standpoint also is just now taking shape, in elementary fashion, 'by feel,' so to speak. This reduces its effectiveness."\*

Planning and control activities are called upon to assist to the maximum in the rational use of all resources at the national economy's disposal. And scientific and technical problems require such planned study, not just from the standpoint of the industry but also from the regional standpoint.

As is known, scientific-research programs were worked out for the 10th Five-Year Plan. They were an active tool for branch and regional planning for the development of the productive forces. The 26th CPSU Congress approved this practice, and 170 such programs were adopted for the 11th Five-Year Plan. And the regular development of an integrated program for the country's scientific and technical development for 20 years, which should be defined more exactly each 5 years, also has been introduced. This program itself and the comprehensive and special-purpose scientific and technical programs that make it up should be broken down specifically not only from the branch standpoint but also regionally.

The CPSU Central Committee and USSR Council of Ministers decree "On Measures to Accelerate Scientific and Technical Progress in the National Economy"

\*V. Kvint. "Key to the Region. Under Integrated Programs." PRAVDA, 22 Mar 83.

recognized that it will be necessary, beginning with the 12th Five-Year Plan, to develop All-Union, republic and industrywide scientific and technical programs, as well as scientific and technical programs for regions and regional production complexes.

In this connection, the development of regional technical and scientific-research programs for studying peat resources is becoming especially important. Unevenness in the distribution of these resources and the concentration of the main reserves in various regions (the Northwest, the Baltic, Belorussia, the Urals, West Siberia and Kamchatka) orients such programs to a study of problems of the integrated use of these regions' peat resources, taking their social and economic development into consideration. It is in such regions that peat resources play an appreciable role as one of the components of the productive forces. Therefore, the concentration of peat reserves and the raw-material properties of peat deposits apparently cannot help but be considered when integrated programs for scientific and technical progress of peat-bearing regions are developed.

The significance of the peat potential and its specific role in developing the productive forces still has not been adequately substantiated economically. The scientific and technical problems connected with assimilating the largest peat resources of the country's principal peat-bearing regions are especially in need of planned development. In the last decade peat-industry scientists and specialists have originated a number of important documents. As a result, a Master Scheme for the Integrated Use of the USSR's Peat Fields for the Period up to 1990 was developed. It anticipated the requirements of the USSR Foodstuffs Program and its predominant alignment was agricultural. Trends toward a reduction and, in some areas, a complete cessation of peat-burning at electric-power stations and toward the development of peat-processing production facilities for the output of high-quality products for various national economic purposes were identified.

The master scheme for the integrated use of peat fields has been a purposeful document for planning and developing the peat industry, agricultural and forestry reclamation on peat lands, and the corresponding nature-conservation activity during recent years. The organization of creative, collective work on the scheme has played a marked role in determining the most optimal use of the peat potential in developing the productive forces of the country's most important peat regions. In the almost 10 years since approval of the scheme for the integrated use of peat fields, considerable revision has been made in its realization. The general trends toward a concentration of peat production for satisfying agricultural requirements and a sharp reduction in peat burning at electric-power stations, especially in the Central Economic Region, have been completely confirmed. The structure of peat output for agriculture, particularly for the rapidly developing seed-bed and hothouse production, reclamation and road construction, fruit and berry production and truck gardening activities has been improved and expanded. Measures and methods for the highly productive assimilation of worked-over peat areas directly by the forces of industrial-peat enterprises in combination with scientific agricultural organizations (Kirtorf [Kirov Peat Production Association], the Kirov Marshy Meadow Station and others) have been defined and have begun to be introduced energetically.

The concepts incorporated in the Master Scheme have found their development in schemes for the siting and development of the peat industry by the year 2000 that were developed by Giprotorf (State Institute for the Design of Peat-Industry Enterprises), with the involvement of a number of research and design organizations for various RSFSR krais and oblasts.

Theoretical studies have confirmed a still wider range of possibilities for the integrated use of peat. Thus, the Dnepropetrovsk Agricultural Institute (DSKhI) got positive results in obtaining physiologically active substances (humates) from peat and from coal for purposes of raising the yields of grains and other agricultural crops. The Kalinin Branch of VNIITP [All-Union Scientific-Research Institute of the Peat Industry], using DSKhI's experience, has created a new product--nitrohumate, which is an activator of plant and livestock growth. Researchers of VNIITP, the Peat Institute of the Belorussian SSR Academy of Sciences and the Institute of Wood Chemistry of the Latvian SSR Academy of Sciences have proved the possibility of successfully producing feed yeast from slightly decomposed high-moor peat. A department with a capacity of 1,500 tons of feed yeast is already being built in the Latvian SSR.

Peat science has also solved the technological prerequisites for obtaining peat wax, alkaline reactants and activated carbons. Works of ENIN [Power Engineering Institute] imeni G. M. Krzhizhanovskiy have indicated the effectiveness of the use of peat in power-industry operations, during which, as a result of thermal decomposition, it is possible to obtain finely divided semicoke with an ash content of 11 percent, a light-ash content of 12-18 percent, and a combustion heat of 6,580 kcal/kg; gas with a combustion heat of 4,300 kcal/m<sup>3</sup>; and peat resin and natural gasoline.

VNIITP has found the technological parameters and has created experimental equipment for the production of heating briquettes--a new type of municipal and household fuel. These and other developments will be a peat-industry contribution to the solution of tasks set by the USSR Power-Engineering Program.

Geological studies have revealed the raw-material potential for the large-scale development of integrated guidance in the use of the peat resources of the country's most important peat regions.

A number of scientific and production articles in the journal TORFYANAYA PROMYSHLENNOST' [The Peat Industry] and in the works and collections of works of scientific-research, geological, design-development and other organizations have been dedicated to analyzing the achievements of peat science and peat production in recent years. As a result, a theoretical and methodological base has been established for further developing an integrated program for scientific and technical progress in peat production. All those principles and calculations that were reflected in the 1974 master scheme for the integrated use of peat fields should also be revised on the basis of it. The main point is that this program of scientific and technical progress in the peat industry be strictly combined and flow from the overall regional development of the productive forces. Especially important is substantiation of the role of peat's potential in developing the productive forces of peat-bearing regions as an integral and organic component of them.

The 26th CPSU Congress and the June 1983 CPSU Central Committee Plenum pointed out very strongly the importance of converting the national economy to the path of intensive development. The peat industry, which is starting to master the country's largest peat regions and to insure attainment of the goals for upgrading agriculture that were called for by the USSR Foodstuffs Program, is making an ever-increasing contribution to this important step.

In considering these factors, it is necessary to increase decisively the effectiveness of scientific research in creating more improved technological processes that will provide for high labor productivity and automation of the more complicated operations and of research in improving social and personal services conditions for the specialists and workers who produce peat.

An ever-greater necessity arises for a theoretical interpretation of the role of the peat potential in the overall development of the productive forces of the country's greatest peat-bearing regions. Attempts have been made to generalize the data connected with this task, to discover the essence of the economic processes that occur during the development of peat production, and to formulate the prerequisites for its further progress. However, this often occurred without due analysis of the modern technical level of peat production in the matter of labor productivity and of the basic processes for intensifying peat production, in comparison with the overall level of these indicators at analogical production activities of the various peat-winning regions. The effectiveness of the influence of peat production and its development on the complex of other economic branches (agriculture, the power industry and so on) of the region, by which the role of the peat potential in the overall development of the productive forces would be evaluated, is not being examined.

It is important to trace the dynamics of the development of peat production in recent years, not only within the industry itself but also in comparison with other mining branches. In so doing, it must be considered that, in the long term, along with the universal achievement of integration of mechanization in the peat industry, provisions should be made for a gradual conversion to the development of automated and integrated-automated production.

The extraction geology for developing the fields is becoming complicated in the peat industry, as it is in the mining and extracting industries in general. This is manifested in conversion to the construction of new peat enterprises, including larger ones, at fields with peat deposits of the high-moor type.

However, it should be considered that bringing large fields of high-moor type peat into operation in such regions as the Northwest and West Siberia promotes the development of more economical and higher-quality production activity. Based precisely upon this peat raw material, it is possible to develop biochemical specialization with the output of such valuable products as feed yeasts, whose production is extremely important for these and other parts of the country, and a new form of use for the heat-insulating properties of high-moor peat--granulated peat insulation--is receiving recognition.

The question of further development of the industry for producing protein and other feed additives for livestock needs was examined by the CPSU Central Committee Politburo in August 1983. The CPSU Central Committee and USSR Council of

Ministers decree adopted for the period up to 1990 contemplated a broad system of measures for developing the production of microbiologicals and other products necessary for obtaining high-quality feeds. It was planned also to implement a broad program of scientific and experimental work in the area of the biological technology and the development of a raw-materials base for obtaining feed protein and to introduce the results of this work into industrial and agricultural production.

The achievements of peat science in the field of obtaining protein and other feed additives from peat raw material, based upon the large high-moor peat fields of the Northwest, West Siberia and other regions, should be introduced. Doing so will create the most rational paths for the joint use of both wood and peat raw material in West Siberia's microbiological industry. Such a potential accrues from the fact that the appropriate branches of the economy are being widely developed in Siberia.

In characterizing our country's major regional program for mastering Siberia's natural wealth, Academician A. Aganbegyan in particular writes that "...important tasks are linked with substantial development in Siberia of a microbiological industry that is based upon local wood and hydrocarbon raw materials....In the forestry complex, preference is being given to the processing of wood, pulp and hydrolytic-type production facilities. In recent years, the Ust-Ilimsk Pulp Plant was introduced at full capacity, with the participation of CEMA member countries, construction of the most huge Bratsk Hydrolytic Plant for producing feed yeasts has started, and, in the nearest future, the construction of a similar plant should be undertaken at Ust-Ilimsk."\*

In the scientists' opinion, the combining of wood raw materials with peat at hydrolytic plants is realistic and effective. With this combination, the scale of output of feed yeasts in the country's peat-bearing regions will grow.

The development of peat chemistry with petrochemicals in West Siberia can also be considerable. In 1983 the first phase of the Tobolsk Petrochemical Combine was introduced. With the concentration here of enormous peat resources, in the area of the Tobolsk combine, one cannot help but consider them as an additional raw-material potential for further development of the output of chemical products and for obtaining from peat, for example, activated carbon, heating briquettes, wax, and peat-alkali reactants. These production facilities can be in the form of various departments that will be technologically blended into the large-scale production of oil and gas chemistry, enabling capital investment to be cut in comparison with the organization of independent development of peat chemistry.

Similarly, in combination with the large processing-industry enterprises of Siberia, the Northwest and other regions, it would be possible to support development of the production of peat products for seed-bed and hothouse activities and of litter, insulation and other materials.

The most economical organization for large-scale long-range use of the peat potential will raise immeasurably its role in the overall development of these

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\*A. Aganbegyan. "Siberia's Fuel." PRAVDA, 1 Aug 1983.



regions' productive forces. The peat problem, just as it once received recognition in the GOELRO [State Commission for the Electrification of Russia] Plan, occupies an appreciable place in the realization of the important tasks that the party and government have set for supporting the development of agriculture and other branches of the agro-industrial complex.

One of the main tasks of modern peat science is that of studying ways to raise in every possible way the role of the peat potential in the overall development of the productive forces of the peat-bearing regions. The results of this research will become a basis for the development and the later specific breakdown of comprehensive and special-purpose scientific-research programs for developing peat production as one of the reliable components for developing the country's productive forces.

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## ALTERNATE FUELS

SELECTED SYNOPSES OF ARTICLES IN TORFYANAYA PROMYSHLENNOST', OCTOBER 1983

Moscow TORFYANAYA PROMYSHLENNOST' in Russian No 10, Oct 83 p 32

UDC 631.61:631.445.12

### GRASSLANDS CENOSES AT MIDDLE URALS PEAT EXCAVATIONS

[Synopsis of article by V. V. Nazarenko in TORFYANAYA PROMYSHLENNOST' No 10, 1983 pp 5-9]

[Text] Questions of the recultivation of excavated peat bogs of the Middle Urals are examined. Brief agrochemical characteristics of residual deposits and the results of computation of the productivity and the botanical composition of experimental and production grass stands are given. 4 tables.

UDC 622.331:635

### TEST OF HOLLOW PEAT POTS MANUFACTURED ON BASIS OF VARIOUS COMPONENTS

[Synopsis of article by N. V. Levsevich, N. K. Vasyuchenok, V. T. Polyankov and P. I. Ometsinskiy in TORFYANAYA PROMYSHLENNOST' in Russian No 10, 1983 pp 10-12]

[Text] The results of a study of experimental hollow peat pots made with various components and the agrotechnical testing thereof in growing cucumbers and tomatoes under hothouse conditions. 2 tables.

UDC 622.331:338.45

### EFFECT OF CHANGE IN PRODUCTION VOLUME ON PRIME COSTS OF PRODUCING OUTPUT

[Synopsis of article by G. M. Penchik in TORFYANAYA PROMYSHLENNOST' in Russian No 10, 1983 pp 12-15]

[Text] A method for computing provisionally constant expenditures by element of expense is cited. 6 tables.

UDC 622.331.634.0.332

### IMPROVEMENT OF PROCESS OF REMOVING WOOD INCLUSIONS FROM A DEPOSIT

[Synopsis of article by V. P. Nikitin in TORFYANAYA PROMYSHLENNOST' in Russian No 10, 1983 pp 15-18]

[Text] The general mechanism of separation processes which enable the quality of removal of wood inclusions from a deposit to be assessed. 1 illustration, 6 references.

## INCREASING PRODUCTIVITY OF BRIQUETTE STAMPING PRESSES

[Synopsis of article by A. K. Kupriyanov in TORFYANAYA PROMYSHLENNOST' in Russian No 10, 1983 pp 18-21]

[Text] The urgency of research in the area of pressing peat and of increasing press-equipment productivity is substantiated. Possible methods for increasing stamping-press productivity and designs of various devices that increase that productivity are examined. 3 tables, 3 illustrations, 6 references.

UDC 622.331:658.562.6

## AN INSTALLATION FOR MONITORING STRENGTH OF PEAT BRIQUETTES

[Synopsis of article by I. I. Lishtvan, M. A. Gatikh and G. T. Korolenko in TORFYANAYA PROMYSHLENNOST' in Russian No 10, 1983 pp 22-23]

[Text] An analysis of peat-briquette strength as a function of various natural characteristics of the peat and of the parameters and modes of press operation is given, functional and constructional schemes for an installation for monitoring briquette strength in a flow-line are described, and the results of production testing of it are cited. 1 table, 3 illustrations.

UDC 661.183.2:628.3

## CHOICE OF EFFECTIVE ACTIVATORS AND MOST SUITABLE RAW MATERIALS FOR OBTAINING ACTIVATED CARBONS FROM PEAT

[Synopsis of article by A. M. Kunin, A. V. Orgutsov, L. N. Pavlova, et al in TORFYANAYA PROMYSHLENNOST' in Russian No 10, 1983 pp 24-26]

[Text] The possibility of using a number of inorganic compounds as effective activators when obtaining activated carbons from peat is indicated. Peat raw materials for producing activated carbons by zinc-chloride and potassium-carbonate activation methods are recommended. Data about the properties of activated carbons made from the recommended raw materials are cited. 2 tables, 7 references.

UDC 665.35.001.5

## STUDY OF PROCESS OF EXTRACTING WAX FROM PEAT DUST

[Synopsis of article by S. V. Zubko and P. I. Bel'kevich in TORFYANAYA PROMYSHLENNOST' in Russian No 10, 1983 pp 26-28]

[Text] The effect of the granulated peat-dust method and of the size and moisture content of the granules for wax output is studied. It was established that the degree of extraction of wax from the granules obtained by the pelletizing method is 100 percent (according to Graeffe), 87-89 percent (the sprinkling method) and 83.56 percent from granules obtained by the extrusion method.

The greatest degree of wax extraction is characteristic for 0.5-3 mm granules. For purposes of industrial extraction of wax from granulated peat dust, its moisture content should be in the 10-42 percent range. 3 tables, 2 illustrations, 2 references.

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## NUCLEAR POWER

### CONSTRUCTION PROGRESS AT IGNALINA AES

Vilnius SOVETSKAYA LITVA in Russian 13 Sep 83 p 1

[Interview with Yu. F. Zhilin by C. Yur'yev: "Startup--The Main Focus"]

[Text] In the socialist obligations of the collective of the Western Construction Directorate (ZUS) for 1983 it is written: "Attaching special significance to the fulfillment of the main task of the year, the startup of operations of the first energy generating unit of the Ignalina AES [nuclear power plant], it is necessary to assure strict fulfillment of the schedule for construction and assembly work at the startup facilities while maintaining excellent quality standards, with the objective of beginning operations of the first energy generating unit in December 1983." Very little time remains until this nuclear power plant is to come on line. Here the director of ZUS, Yu. F. Zhilin, tells us how things are going on the most important construction project in the republic.

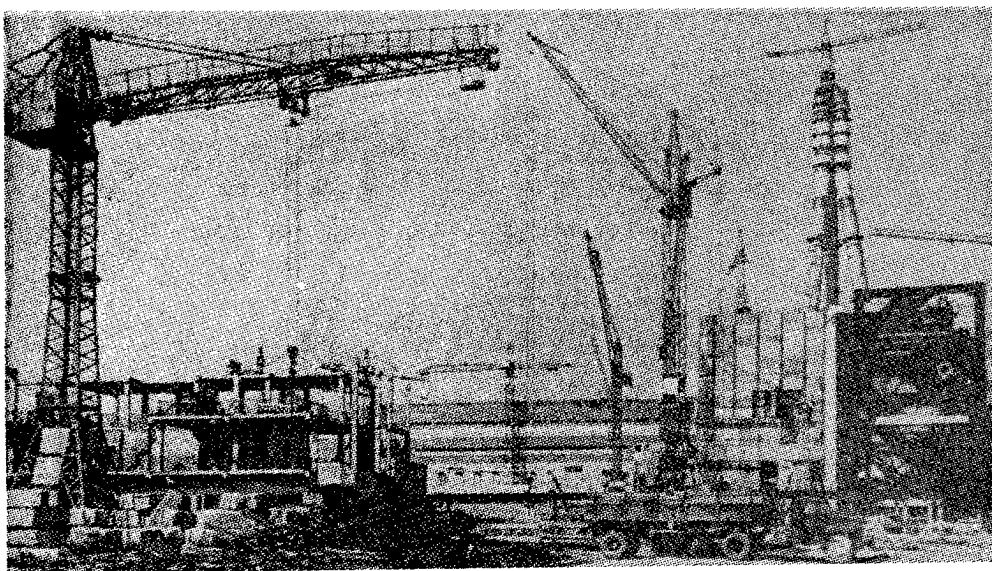
[Zhilin] At present the entire collective of developers of this nuclear power plant are concentrating on the nuclear reactor: operations here are moving along ahead of schedule, and this is forcing the other participants in the construction project to catch up. The hot flushing of the reactor was successfully completed as well as the testing of all eight main circulating pumps. This indicated that the circuit, the equipment, and the armatures were all in a good state of readiness. In other words, the assemblers have performed their assignment very well. The control system for the reactor shield is complete. Now we have before us the hydrotesting of the entire circuit, and then we have to load the fuel. And finally there is the physical startup of the reactor; the heart of the atomic Hercules will begin to beat. This will be the most important stage prior to the startup of energy generation slated for December.

[Question] The status of work on the reactor inspires optimism. But I would like to hear as well about how the problems elsewhere at the project are being resolved.

[Answer] The collectives of builders and assemblers have completed several important assignments. For practical purposes the water circulating systems have been completed. The systems for the chemical treatment of the water have been tested. The compressor installations are operational. But there

is still a lot of work to be completed on the adjustment and startup of the ventilating equipment. We are being held back by incompleteness of the units and of the electrical equipment. Much remains to be done in the ventilation control rooms. Our objective is to complete these tasks by 7 November.

[Question] I remember that at one time there were fears that there would be serious delays because of late deliveries of the deaerating tanks and the drum separators. How do things stand now with deliveries of equipment?



General View of Ignalina Atomic Power Plant Construction Site

[Answer] Yes, there have been disruptions. But now the situation has been normalized. The enterprises of the country which are assuring the construction of the Ignalina Nuclear Power Plant (and there are about 500 of them), correctly understand their assignment. There have been no such delivery delays such as those you have mentioned. This has to no small degree been facilitated by competition on the principle of a "workers' relay race" in which enterprises and organizations of the industry participating in the construction of the Ignalina Nuclear Power Plant joined us. Manufacturing plants, design and other organizations have been focused on the timely fulfillment of their orders, and we are aiming for precision in the performance of construction and assembly work.

[Question] How are you resolving delivery problems of materials and equipment here at the job site?

[Answer] We have established a Production and Technological Supply Administration (UPTK), which resolves these questions, so to speak, in a centralized manner. Not all of its activities are proceeding smoothly, but the collective is trying, and through our common efforts we are succeeding in obtaining quite good results. For example, we have been able to arrange for reliable delivery of bricks, which was not the case previously. The supply of large panel house construction components has improved. The UPTK collective is successfully coping with its assignments in many other areas as well. At the building site the longer than normal idle times for freight cars during loading-unloading have been eliminated.

The collective of the Industrial Enterprises Administration (UPP) is supplying the construction site with concrete. Every month they unload for us more than 30,000 cubic meters of mix. But still the output of precast reinforced concrete from UPP must be improved.

[Question] Tens of large and small collectives are working on the Ignalina Nuclear Power Plant construction project. What kind of success have you been having in coordinating their activities?

[Answer] There is nothing new here. It has been necessary to apply in a skillful way well-known management techniques that have been verified in practice. Twice a day, for example, (in the morning and the evening) we conduct mass strategy meetings which are attended by representatives of all the subdivisions. At these meetings the day's assignments are defined and reviewed, and pressing problems resolved.

Important work is performed by party, union and Komsomol committees. They concern themselves with visual propaganda focusing the efforts of the workers on the fulfillment of assignments, publicize the names of the best workers and those who are lagging, monitor the course of socialist competition to reduce construction time of the nuclear power plant. The ZUS division of scientific organization of work and management regularly takes "photographs" of the work day in various subdivisions, a practice which allows it to evaluate them on a regular basis and make corrections in their activities.

[Question] You have participated in the construction of many important national economic facilities, including the Leningrad Nuclear Power Plant. In your opinion, do the creators of the Ignalina Nuclear Power Plant have their achievements which could add to the experience you have accumulated in this field?

[Answer] Definitely. On this job, for instance, we have introduced on a mass scale the mechanized laying of in-situ concrete. The concrete pumps used for this purpose have made it possible to free up for assembly work a large number of cranes. Thanks to the use of nonremovable reinforced concrete forms we have been able to reduce significantly the work involved in the erection of precast structures. In addition, the builders of the Ignalina Nuclear Power Plant used for the first time in domestic practice a walking transporter for delivering the nuclear reactor assemblies from their place of manufacture to the main building. And, finally, we have developed the first factory in our

sector for the consolidated assembly of equipment and metal frameworks. But perhaps the greatest achievement should be considered the development of a strong, united collective, capable of performing any task. It is not by accident that construction of the second energy generating unit of the plant is being projected to take place in a more compressed time frame.

[Question] Thus, in December the Ignalina Nuclear Power Plant will be on stream. What role will it play in the economy of the country? And why was Drukshay Lake chosen as the location for construction of the plant?

[Answer] It is possible to provide a short answer to these questions. The lake is situated favorably, at the junction of three republics--Lithuania, Latvia and Belorussia. Look at the map: the startup of a nuclear power plant here makes it possible to provide cheap electricity to the northwestern portion of the country.

9276

CSO: 1822/58

## NUCLEAR POWER

### SCIENTISTS ASSIST IGNALINA AES STARTUP

Vilnius SOVETSKAYA LITVA in Russian 21 Oct 83 p 1

[Article by Yu. Stroganov: "The Giant Gathers Strength"]

[Text] At Construction of the Ignalinskaya AES.

News recently spread throughout the country about the physical startup of the Ignalinskaya AES's first nuclear reactor. A senior reactor control engineer (SIUR) took his seat at the control panel. Simultaneously, the scientists began their work.

There are several senior reactor control engineers here; research and loading of the apparatus with fuel continue around the clock. Preparations are under way for startup of the first power unit. The specialists wear white coveralls, white hats and white gloves. Sterility is like that of an operation.

In general terms, an AES's operating principle is simple: seemingly, the same as those of a thermal station. But the fuel, in accordance with the era, is special--it is nuclear. As much energy is obtained from 1 kilogram of uranium, as is well known, as from the combustion of 3,000 tons of coal! That is why the nuclear furnace is much more complicated than a steam boiler. The Ignalinskaya AES's nuclear reactor is a gigantic but unusually delicate structure. There are thousands of tons of metal structure, hundreds of kilometers of cable and pipelines, specially built units and electronics. The enormous system, which operates as precisely as a clock, is obedient to man's will. The gigantic heart of the Ignalinskaya AES has no equal on earth. Man has not yet created a nuclear reactor of such power--1.5 million kW.

The design is absolutely reliable and safe--it has been tested in practice and proved by time. The fact is that reactors of 1 million kW capacity have already been operating for 10 years now at the Leningrad AES. The design of the Ignalina variant is practically the same, but an original improvement has enabled the equipment's power to be increased 1.5 times. Incidentally, the 1.5 million kW is its power capacity; its thermal capacity is 4.8 million kW. Its efficiency is 31 percent. An excellent indicator for a nuclear power station!



True, until the nuclear giant exerts its full strength, much scientific research remains to be done, for which deputy chief engineer for science B. Vorontsov is responsible at the station. The SIUR's, relieving each other on shift, load nuclear fuel under the eye of the commission for the physical startup. When the critical mass was achieved, much became clear to the specialists. Thus, it could have proved to be slightly more or slightly less, depending upon how well the builders had done their work on the reactor. In this case the operators, upon the recommendation of the scientists, would have introduced corrections into the program for servicing the apparatus. However, this was not necessary. Everything went in strict accord with what had been planned.

At the moment of physical startup, the scientific staff workers measured the performance of the nuclear furnace. A high-speed electronic computer compared this with the calculated data and issued the result of its analysis: there was complete agreement!

However, study on this subject has not ceased. The engineers and scientists are following the processes that occur in the reactor, according to the instruments on the unitized control panel. SIUR's V. Ledovskiy, I. Zinevich and their colleagues work in the station's central building. They continue to load the apparatus, watched by the physicists. The reactor's characteristics are checked after each new portion of fuel.

The day of full-scale loading of the reactor is nearing. The nuclear giant is gathering strength, and then the scientists, after thoroughly studying the apparatus, will give the "go" for the power-engineering startup.

Not just the electric-power station personnel are getting ready for it. The collectives of SMU-1 [Construction and Installing Administration No 1] and SMU-10 and other subunits of the Western Construction Administration, as well as the installers and tune-up personnel, are working in shock-work fashion. The erection of auxiliary facilities is being completed, and the whole complicated ventilation system is close to introduction into operation. The last work is being done on the first turbogenerator, which will also transmit the power of the nuclear reactor to plants and factories and to our apartments.

Socialist competition for reducing construction time continues. The current-operations staff that was created at the main site sums up its results daily. Leading are the brigades of I. Aleynikov, A. Ponomarev, V. Matuzov, B. Machyulaytis and V. Kozhenmyakin and other collectives.

11409

CSO: 1822/59

## NUCLEAR POWER

### FIRST UNIT BEGINS OPERATION AT IGNALINA AES

Vilnius SOVETSKAYA LITVA in Russian 5 Oct 83 p 1

[Article by Yu. Stroganov: "One achievement after another: The Physical Startup of the Nuclear Reactor Has Taken Place at the Construction Site of the Ignalina AES"]

[Text] The creators of the Ignalina AES had prepared for this event for more than a year. And, finally, the exciting moment had come: any moment, the gigantic heart of this energy generating bogatyr which had arisen on the shores of Lake Drukshyav would begin to beat. Each of the four reactors has a capacity of 1.5 million kilowatts. Today is the birthday of the first one, "the apparatus," as they call it here.

There is quiet in the central chamber of the AES. The loading of the fuel is taking place. A special crane is smoothly sliding it into the fuel channels. Tens of people both in the hall and near the unit control panel concentrate on instrument readings. The absorber rods controlling the reactor shielding system are gradually withdrawn.

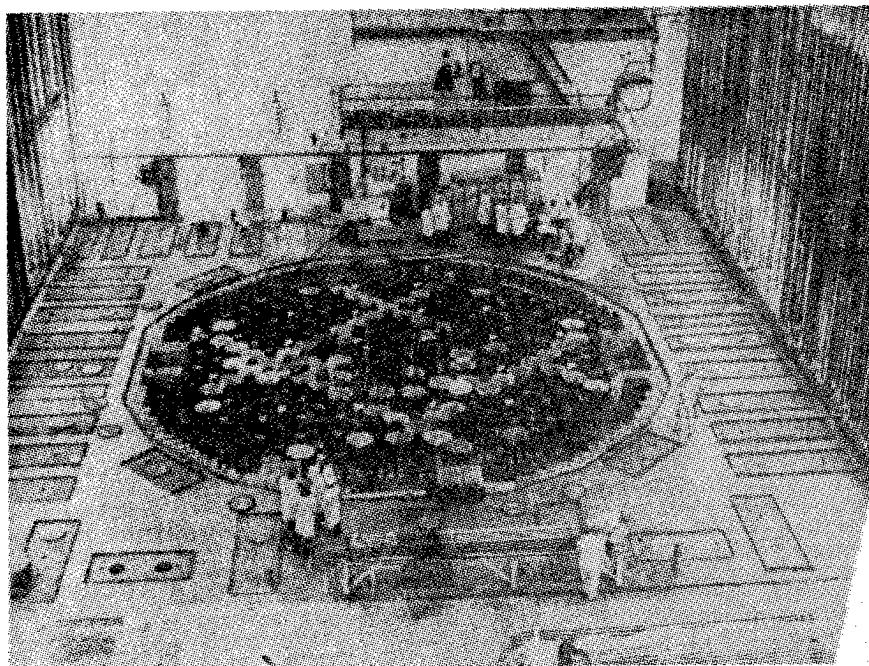
Done! The instruments tell the tale; the reaction has started. In the central chamber nothing has changed, but far below, in the belly of "the apparatus," an invisible process is already underway. The indefatigable atomic worker has set to work. It is true that for the time being they have not allowed him to display his full power. Restrained by people, he is demonstrating only one millionth of his potential. But even this is adequate to begin research connected with finalizing the physical characteristics of the reactor. These will take place over a month. Only then will "the apparatus" be ready for start-up in an energy generating capacity.

The reactor has come to life. His steel mass, hidden in an immense reinforced concrete body, is the fruit of human intelligence and skill: designers, scientists, builders, assemblers, adjusters and operators. I remember that 2 years ago I first happened to spend some time in the brigade of assemblers headed by Hero of Socialist Labor V. Dostavalov. Not far from the main chamber of the AES, in special quarters, the brigade was engaged in the consolidation assembly of units--the so-called nuclear reactor circuits. We were walking on top of a huge steel drum, from the hatches of which voices of the assemblers could be faintly heard. I knew that in the near future the powerful nuclear force would be throbbing and that "the apparatus" would easily keep it within bounds.

But the imagination would not accept this, and only the assured face of the brigade leader forced me to believe that this would be the case.

Later, when the brigade of G. Mar'yasov, also a hero of socialist labor, placed the drums one on top of the other in the reinforced concrete shaft of "the apparatus," it appeared that there was no end of work ahead for the creators of the AES. After all, the assembly of a reactor is no small assignment. Thousands of different systems, beginning with the smallest electronic components and ending with the diesel units and the pumps, had to be brought together and adjusted before proceeding with the physical start-up.

Also keeping up pace with the veterans were the Komsomol Youth Collectives headed by G. Kuryakin, P. Vasil'ev and others. The assemblers showed that they all were very skilled, well trained and possessed broad experience. G. Maryasov, for example, has already been a brigade leader for almost 30 years. He has erected important national economic facilities, and worked as an assembler on the metal frameworks for all four units of the Leningrad AES. G. Kuryakin is significantly younger, but also a knowledgeable worker; he was the one entrusted with the welding of the reactor circuit. I. Pazynich, director of the senior brigade, received on the banks of Drukshyay the honorary title of honored builder of the Lithuanian SSR. Due to his suggestion to improve efficiency, on-site produced permanent metallic molds with increased area were used in the construction of the AES rather than factory molds. This permitted savings of tens of thousands of rubles and speeded up the construction of the reactor shaft and other facilities by more than a month.



Interior of Ignalina Atomic Reactor Chamber

There are many people who enjoy their work at ZUS. Among them are foremen S. Milenin and S. Romadanov, manager I. Ovechkin, brigade leaders A. Terekh and I. Perevalov, tower crane operator S. Vismantayte, excavator operator T. Gaydel' and many others. They set the pace here, working as they do with full commitment. The results of the labor competition are evident every day at the job site, and makes it possible to eliminate bottlenecks. Thanks to this, the construction, assembly, and adjustment tasks have been successfully carried out quickly and well. All facilities have been erected, and water from Lake Drukshyay has been brought to the walls of the AES. In the chemical division the water is rid of impurities, becoming hundreds of times cleaner than distilled water, and acquiring a special feature; this kind of water can no longer become radioactive. Hot and cold flushing of the reactor, hydro-testing and other operations have been efficiently performed. The operators of the AES also performed well during preparations for the physical start-up of the reactor. They include senior foremen V. Bochkarev, and V. Kobozev, the fitter S. Solomein, shift foreman V. Antip'yev, senior supervisor and electro-assembler A. Shilov, and engineer of the research division, M. Nefed'yev.

The physical start-up of the reactor marks the completion of a very important stage in the construction of the Ignalina AES. As we know, the ZUS collective has committed itself to bringing on line the first generating unit of the station by December of this year. And along with this, construction is proceeding full blast on the second energy generating unit. Its start-up year--1958--has been set by Basic Guidelines for the Economic and Social Development of the Country as adopted by the 26th CPSU Congress. And again the brigade of Hero of Socialist Labor V. Dostavalov will assemble the units of a nuclear reactor.

9276

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## NUCLEAR POWER

### BRIEFS

INCREASE IN ELECTRICITY--Kurchatov (Kursk Oblast)--The flow of electrical energy generated by the Kursk AES has been increased. Yesterday comprehensive testing began on a new energy generating unit with a capacity of 1 million kilowatts. After approval has been given to all the reactor systems of this third "millionaire," it will begin continuous operation. [Text] [Moscow TRUD in Russian 7 Nov 83 p 1] 9276

ZAPOROZHYE ATOMIC PLANT'S PROGRESS--"Persistence is a mandatory requirement in our work," assures I. Popov, brigade leader of Elektromontazh Trust Department No 10. "There is no alternative." Construction of the first energy generating unit with a designed capacity of 1 million kilowatts at the Zaporozhye AES is currently entering the home stretch. The general contracting collective of the AES construction management's Order of the Red Labor Banner, installing and special services organizations are purposefully proceeding to their assigned objective: to make the first nuclear power plant in the Dnieper region operational in December. Not a day without an achievement, not a day without a record--this is the task that the nuclear power plant builders have set themselves. I. Popov continues. "I will explain what is going on here. We are directing the assembly of the equipment controlling the computer system. This is the first installation of a unique system. Its complexity is also due to the fact that in this location we must lay hundreds of kilometers of cables. These are cut into pieces about 150m in length. There are 25 wires in each cable, each one of which must be hooked up in a strictly designated location, then checked. Organization, patience, persistence are all the mandatory conditions of our work, and are adhered to by N. Timoshenko, N. Andreykina, M. Dunaeva and others. Despite all appearances of slowness we are achieving high output. With a norm of 2,100 rubles, we are turning out a norm of 2,300 per month. The assembly and adjustment of the control and backup control panels and the controlling computer system is the prestart-up program for this collective. Its fulfillment is a matter of our honor." [Text] [Moscow STROITEL'NAYA GAZETA in Russian 30 Sep 83 p 1] 9276

GORKY, VORONEZH GET'AST'PARTS--Leningrad--Collectives of the Izhorskiy Zavod and Atomnash Production Associations have begun the joint production of nuclear "boilers" to supply heat to cities. The Leningraders have shipped to their partners the first units of shell-rings for the reactor housings for thermal nuclear plants (AST) which are being built at Gorky and Voronezh. Each AST will be able to supply hot water to a region with a population of 300-400,000 people. [Article by D. Mikhaylov] [Text] [Moscow SOTSIALISTICHESKAYA INDUSTRIYA in Russian 2 Nov 83 p 2] 9276

IGNALINA AES START-UP--Snechkus settlement, Lithuanian SSR--The physical start-up of the nuclear reactor at the Ignalina nuclear power plant was realized yesterday. This event is a major landmark on the way to the operational start-up of the first energy generating block which has been slated for December.

...A tense silence reigns at the block control panel, as procedures go on for activating the reactor. In a minute or two the atomic heart of this energy generating giant will start to beat. And, now, the instruments show it: in the belly of this steel mass, hidden in an immense reinforced concrete body of the station, a nuclear reaction has begun. By the book. But the faces are still fully concentrated: the most sensitive instruments are making observations of the invisible process. It remains to carefully study the behavior of this reactor. Only then will it be permitted to gather its strength. Peaceful nuclear energy generation has still not known such a bogatyr: it has a designed capacity of 1.5 million kilowatts. Only in the fraternal unity of the peoples of the USSR could such an achievement be possible. The equipment and materials for the construction of the Ignalina AES were delivered by 500 enterprises of our country, with upwards of 40 nationalities being represented among the creators of this energy generation giant. [Article by Yu. Stroganov, editor of the ZUS [Western Construction Directorate] newspaper ENERGETIKA, and D. Shnyukas, PRAVDA correspondent.] [Text] [Moscow PRAVDA in Russian 5 Oct 83 p 1] 9276

ATOMIC ENERGY AGENCY MEETING--(UzTAG)--On 5 September in Tashkent, the inter-regional courses on neutron and nuclear physics convened, given by the International Atomic Energy Agency (MAGATE). Young scientists and specialists, representing primarily Third World countries are attending a series of lectures on the various aspects of the peaceful use of nuclear energy, and studying the experiences which have been accumulated by the Soviet national economy, and in part those in Uzbekistan. Course activities were opened with an introductory word from the vice president of the Uzbek SSR Academy of Sciences, corresponding member of the republic Academy of Sciences, P. K. Khabibullayev. Carlos Veles, representative of the general director of the International Atomic Energy Agency, also welcomed the attendees. The work of these interregional course has been organized by the Uzbek SSR Institute of Nuclear Physics of the Academy of Sciences. [Text] [Moscow PRAVDA VOSTOKA in Russian 6 Sep 83 p 3] 9276

RECORD 70-TON INGOT CAST--Leningrad--In both a literal and a figurative sense the new contribution of the Izhorskiy Zavod Association metallurgists to the development of the energy generating complex of the country has turned out to be considerable. Although they have already learned how to cast superingots weighing up to 300 tons, the 70-ton piece that was cast on 13 October is also a record-setter. It was the first such domestic heavyweight designated for the manufacturing of equipment for nuclear power plants, and was cast from alloy steel with a complex chemical composition. This ingot has been designated for the production of seamless not welded, as previously, large-scale components for million kilowatt turbines. This will guarantee increased unit reliability, shorten the manufacturing time for complex equipment, and yield significant savings in the fabrication of expensive alloyed material. [Text] [Moscow SEL'SKAYA ZHIZN' in Russian 14 Oct 83 p 1] 9276

## NON-NUCLEAR POWER

### LENINGRAD METALLURGY PLANT DELIVERS TURBINES TO SAYANO-SHUSHENSKAYA GES

Leningrad LENINGRADSKAYA PRAVDA in Russian 21 Sep 83 p 1

[Article by L. Ivankin: "Get Ready, Yenisey!; Pledges Are Being Fulfilled"]

[Text] Collective of the Leningrad Metallurgical Plant  
Association Complete the Manufacture of the Final, 10th  
Turbine Wheel for Sayano-Shushenskaya GES

To be precise, the turbine builders have built 12 wheels. The first two were temporary and operated at an incomplete dam with reduced water heads. A similar type had been used for the first time for domestic hydroenergy generation.

Between the steep banks of the Yenisey the high dam continued to rise at the same time that the station was already generating power. These spare wheels carried out their duties for 5 years, stopping recently. The meters recorded the totals from their operation: 16.5 billion kilowatt hours of cheap electrical energy produced by the first two units. This performance marked the realization of the original engineering projections.

The regular wheels will occupy a permanent place where the temporary ones were located. And the builders of the station have decided to put one of the removed wheels on a pedestal, to preserve it for their descendants as a monument to the creators of the energy generating giant in Sayany.

For V. A. Bobko, leader of the welder brigade, the tasks and events which have marked the years that have flown by from the startup of the first to the last turbine wheels, literally have not faded into the past, but only just happened, yesterday, today. That is the way it is when one is enthusiastic about a large, captivating task.

It seems that only recently they were visited in their workshop by V. S. Demidenko, the distinguished Sayan installer and candidate for CPSU Central Committee. He had taken delivery of the first wheel from the turbine builders. And now, exactly 6 years after his first visit he had again come to Leningrad, so as to send off the 10th wheel on its long trip. This is the rhythm that has been established here: two turbines were shipped annually to Sayany. And each one has been on time. The manufacturing of the equipment proceeded ahead of schedule, thus opening up the real possibility that the station could be set up significantly earlier than at first thought: to

bring it up to full capacity, 6.4 million kilowatts, by the 11th Five-Year Plan.

In order for the established objective to be realized, the basic equipment had to arrive at the building site during the present navigation period. The production of the 10th wheel was not included in the annual plan of the turbine builders. It was necessary to manufacture it over and above what was already a very intensive program. And their target was September, while the Northern Sea Route is still open and the waters of the Yenisey free from ice.

The coordinating committee of the participants in the scientific and technical design cooperative, the creators of the Sayano-Shushenskaya GES, agreed with the action of their partners, the equipment producers. The collective of the Izorskiy Zavod Association undertook the task of producing the upper and lower wheel rims and the hard to find blades. The "Elektrosila" employees committed themselves to speeding up the production of the larger components of the last hydrogenerator.

The turbine producers adopted a counterplan in which they included the manufacturing of the 10th permanent wheel. And it was still necessary to put the finishing touches on the ninth one. And even though they completed this one ahead of schedule, there remained only just enough time to fulfill the counterplan order. Indeed, no carefully designed technology can provide all of the reserves of energy which are found in human nature.

Hero of Socialist Labor I. V. Morozov's brigade of vertical boring and turning machine operators were working on the wheel rims at full speed when the unexpected happened: a giant 12-meter turning machine malfunctioned. A more unpleasant situation could not have been imagined. However, for true masters there is no such thing as a hopeless situation. They made the decision quickly: switch the rim to the 9-meter turning machine attended by the young operators of V. I. Losevskiy's brigade. They had never had the occasion before to deal with such huge products. But they understood, there was no alternative. The machine operators passed this difficult examination with honors.

The welders from V. A. Bobko's brigade, N. A. Makhov and B. A. Osilov had just returned from a 4-month assignment in Egypt, where they had participated in some preventive maintenance on the turbines of the Aswan GES. They were due a well-earned rest. But recognizing that the shop needed working hands, the welders put off their vacation. The welding of metal heated to 120-150 degrees proceeded around the clock.

The seam finishers of the brigades of K. V. Petrov and N. V. Ul'yanov joined the project at its final stage. For three 16-hour days they did not leave the shop, finishing all the welded seams and cleaning the blade surfaces.

The steamship Pomorsk was already on its way to Leningrad for its important cargo (the Kalinigrad dock workers had prepared it for sailing in 30 hours, at the request of the 'Dogovor 28' Coordinating Committee, instead of the standard 4-day preparation period), when a powerful Bogatyr-4 crane lifted the pier of the Leningrad Metal Plant, the gigantic steel "flower" with the clear logo:



"Leningrad-Sayany" onto its deck. Hundreds of turbine builders came out to see it off on its long sea voyage: those who had designed it, those who had embodied in metal the ideas of the designers, the builders, those who had brought the achievement of the objective closer with their work, those who continue to work to bring to life the Energy Generation Program of the country even today.

...Recent, passionate events are becoming matters of the past. But welding brigade leader V. A. Bobko is not looking for easier times either for himself or for his shop comrades. Production has already begun on the turbine wheels of the country's first reversible, pumped water storage plant, which is being built in Zagorsk, near Moscow. At times of peak energy usage its turbines will be generating electricity, then when the load falls off they will be operated as gigantic pumps to fill up a reservoir. The Leningrad Metal Plant Association is producing such equipment for the first time. This means that once again exciting, creative days lie ahead of them.

9276

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## NON-NUCLEAR POWER

### NEW ADVANCES IN ELECTRICAL-INSULATION MATERIALS

Moscow PRAVDA in Russian 3 Sep 83 p 2

[Article by F. Sapozhnikov, deputy minister for energy and electrification of the USSR: "A Mica Substitute: In Competition for a USSR State Prize"]

[Text] Progress in the building of electric power generation machines is to a significant extent conditioned by the quality of electrical insulation materials. This insulation, the thickness of which is usually measured in millimeters, essentially guarantees the operating reliability of powerful turbo- and hydrogenerators. The smallest amount of damage to the winding insulation leads to a shut down of the units, and this means that plants, factories, schools and hospitals can be left without electric power.

The only material whose technological parameters and characteristics correspond to all requirements is natural mica. Until recently the insulation of high-voltage electrical machinery was manufactured using natural shredded mica and thermoplastic, bitumen based binders. During this process not all of the extracted mica found its way into the material--only its large crystals. This so-called compounded mica-tape insulation had numerous shortcomings. The low yield of natural mica from extraction operations, not exceeding 10 percent, the complex processing requiring the broad application of manual work, and continually increasing demand have urgently raised the question of a substitute.

The All-Union Scientific Research Institute for Electrical Insulation Materials and Foil Dielectrics (VNIIEIM) and the Leningrad "Elektrosila" association, along with a number of Minstroyaterialy [Ministry of Construction Materials] have succeeded in doing this. They have created micaceous fibers and micaceous plastics. The base for both are micaceous papers, the production of which utilizes the wastes accumulated over many years at the plants of the mining industry. For the first time it has become possible to exclude manual labor from the processing of mica.

The high efficiency of progressive technical processes has made it possible, without increasing the volume of extracted raw materials or the total number of employees, to double the output of electrical insulation material, at the same time that labor productivity at the new production lines of mica industry enterprises has increased more than 40 times, thus saving the labor of 21,000 people.

Based on the materials proposed by the specialists of VNIIEIM and "Elektrosila," several variants were created of a fundamentally new, so-called thermoreactive insulation which retained its basic properties over a broad range of temperatures. Special epoxy resins and hardeners were developed by the Ukrainian Institute for Plastics. The technical processes for the manufacture of winding insulation for high voltage electrical machines has thus been improved in a radical fashion.

The originality of the above solutions is confirmed by 49 author invention certificates, several of which have been patented abroad.

At present all turbo and hydrogenerators being manufactured in our country are produced with thermoreactive insulation. This insulation has assured an increase in the capacities of large electrical machines, in particular the manufacture of turbogenerators with a unit capacity of up to a million kilowatts.

A few years ago it became necessary to replace several generators at the Bratsk GES that had outlived their useful lives. The use of this new insulation made it possible to approach this problem in a nontraditional way. This was the first opportunity, in the course of "restoring" the windings, to increase substantially the rating of the generators at the same time. The Bratsk GES has thus received additional capacities equal to the entire Kakhovskaya GES.

It is important to note yet another matter. The upgrading of standard generators with thermoreactive insulation has expanded the production possibilities of electric power generation machine factories without additional capital expenditures, since the capacity of generators increases by an average of 20 percent thanks to the high electrophysical properties of this new insulation. In other words, every five generators take the place of six of their predecessors. As a result great savings are achieved both at the stage of power station construction and during the production and servicing of generating units.

At present more than 400 hydro- and turbogenerators with thermoreactive insulation are in service at the power plants of this country. Their mean susceptibility to damage has decreased by more than a factor of three, thereby increasing the operational reliability of power plant operation.

This important contribution to increasing the fuel and energy generation potential of the country has justifiably been submitted in competition for a USSR State Prize.

9276

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## NON-NUCLEAR POWER

### BRIEFS

MINELEKTROTEKHFROM AGREES WITH CRITICISMS--Minelektrotekhprom [Ministry of the Electrotechnical Industry] considers the critical comments made in the review "A Unified USSR Electrical Power Generation System" to be correct. Taking into account the seriousness of the problems in the creation of a full complement of electrical equipment 1,150 kilovolts alternating current and 1,500 kilovolts of direct current LEP [electric power transmission lines] is continuously monitoring the progress of the fulfillment of assignments and the timely delivery of electrical equipment to construction sites. In June, manufacture was completed and shipment made of one VNV-1150 circuit breaker, with the second to be put into service in August on the startup section of the Ekibastuz-Kokchetav LEP with a tension of 1,150 kilovolts. According to agreements with USSR Minenergo [Ministry of Energy and Electrification], instead of the two VO-1150 on-off switches projected in the plan for production in 1983, two additional VNV-1150 circuit breakers will be produced in September-October. In a joint decision, Minelektrotekhprom and USSR Minenergo have approved a planned schedule for the carrying out of preassembly revisions, assembly work and the breaking in period for the electrical equipment at the Ekibastuz and Kokchetav substations that will assure the startup of this line in 1983. In accordance with the comprehensive target program for research and development, a technical design has been worked out for a KSVB-350 model synchronous condenser. Its manufacture requires the construction of a special winding-insulating hall at the main plant of the "Uralelektrotyazhmash" industrial association imeni V. I. Lenin. [Text] [By V. Subachev, deputy minister of USSR Minelectrotekhprom] [Moscow EKONOMICHESKAYA GAZETA in Russian No 35, Aug 83 p 2] 9276

POWER LINES TO OCEAN--Selikhin (TASS)--The installation of supports for the Komsomolsk-on-Amur / Sovetskaya Gavan' electric power line (LEP) has begun on the Sikhotealin ridge. The basic work load in the running of an LEP-220 under mountainous conditions, where it is practically impossible to use surface equipment, is undertaken by helicopters. The accumulated experience of these aviators is making it possible as early as the end of this year to deliver current from the Zeisk GES to settlements of railroad employees, timber enterprise workers and fishermen of the Pacific coast. [Text] [Moscow SOTSIALISTICHESKAYA INDUSTRIYA in Russian 6 Sep 83 p 1] 9276

ENERGY WORKERS OVERFULFILL PLAN--The collectives of the Sevkavkazenergo enterprises have overfulfilled their assignments for the first 1½ years of the 5-year plan for all the technical and economic indicators. During the current

5-year plan the power industry workers of Severnaya Osetiya have built more than 400 kilometers of electric power lines and 10 substations, and are fulfilling planned targets for the putting into service of capital assets. For more than 2 years, Sevkavkaxenergo has been working without an accident. Electrical energy requirements in this mountain kray have grown by 29 percent over the past 2 years, and a reliable supply of electrical energy for the rural inhabitants has been assured. The government of the republic has earned first place in the All-Union socialist competition for the 6th time in the 11th Five-Year Plan and was awarded the Red Challenge Banner of USSR Minenergo and the Central Committee of the sector's trade union. [Text] [By V. Artemenko, PRAVDA correspondent] [Moscow PRAVDA in Russian 1 Sep 83 p 2] 9276

SEVERNAYA TES NEARING COMPLETION--The agreement on creative cooperation of all participants in the construction of the final, fifth energy generation unit of the Severnaya TES--a powerful thermal electricity generating plant in the northern part of Leningrad--has worked effectively. Yesterday at the building site startup adjustments were begun on time on a 100 megawatts turbine, and a pair of boiler units tested for tightness. Representatives of the customer, the Sevnenergostroy, Sevnazapenergomontazh and Gidroelektromontazh trusts, and the designers have been conducting daily sessions of the construction administration where specific tasks were assigned to everyone. As a result the participants created for themselves in advance a work front that has meant a minimum of idle time, which is normally so common at construction sites. The units of the Severnaya TES operate in the most economical thermal production mode: along with the generation of electricity they also provide the city with hot water. With a minimum of specific outlay of fuel this 'electricity factory' supplies a region with more than 400,000 inhabitants with heat. This expansion of the Severnaya TES is being implemented in accordance with the general plan for the supplying of heat to Leningrad as formulated by the Leningrad soviet ispolkom. A rebuilding of the thermal electric power systems of the city is taking place with the objective of closing smaller boiler rooms which use fuel too extravagantly. [Text] [By S. Davidov] [Leningrad LENINGRADSKAYA PRAVDA in Russian 9 Sep 83 p 2] 9276

BOILERS NOW LIGHTER--Taganrog--More than 60 percent of the thermal electric power stations in the country are outfitted with steam boilers from the Taganrog Industrial Association "Krasnyy kotel'shchik." Steam generators and heat exchange devices manufactured here are exported to 36 countries throughout the world. Recently yet another desirable feature was added to these boilers; they became lighter. For instance, thanks to the use of membrane water savers it was possible to save 30 tons of metal per boiler. The in-house research and development facilities which have been established at the association make it possible to test these units at the plant. [Text] [By V. Uzhakin] [Moscow SOTSIALISTICHESKAYA INDUSTRIYA in Russian 23 Sep 83 p 2] 9276

NEW BOILER CLEANING EQUIPMENT--(ETA)--Forced air units, the serial production of which began at the Il'marine plant, will help to assure the long-term uninterrupted operation of contemporary thermal electric power plants. Such units are produced in our country only at this enterprise in Tallinn. It is

an innovation that was designed in cooperation with experts from Leningrad. It permits the cleaning of operating boilers without shutting them down, which significantly increases the KPD [efficiency] of the energy generation equipment, thereby reducing fuel consumption. The basic customer for this new Il'marine product is the Berezov GRES that is under construction in Siberia. This facility will service the Kansk-Achinsk Fuel and Energy Generation Complex. The first forced air units have already been shipped. By the end of the year the builders of this energy giant will receive from Tallinn a full complement of equipment--70 forced air units of increased capacity and reliability. [Text] [Tallinn SOVETSKAYA ESTONIA in Russian 7 Sep 83 p 2] 9276

NEW 300,000 KW TURBOGENERATOR--The first components of a turbogenerator with a capacity of 300,000 kilowatts have begun to be produced at the Leningrad Elektrosila Association. The unit, which will use the principle of superconductivity, opens the way to a new generation of electrical machinery. [Text] [Moscow EKONOMICHESKAYA GAZETA in Russian No 37, Sep 83 p 3] 9276

GENERATION UNIT PROVES ECONOMICAL--Khabarovskiy Kray--Even at startup, the power generation unit installed at the Maysk GRES in accordance with its reconstruction plan has demonstrated economical operation. The waste heat salvage unit included in the full complement of equipment has been hooked up to the system and is serving the entire plant. Now 10 tons of standard fuel are saved here every day. The descriptive term 'thrifty' was imparted to its offspring by the manufacturing enterprise--the Baltiyskiy Zavod Leningrad Association--in the technical specification sheet of their product's exceptional temperature parameters. These qualities were made use of immediately. The builders and operators of the Maysk GRES, without waiting for the end of the reconstruction, went ahead and hooked up the waste heat unit to the operating units of the station. And the instruments indicated that its operation corresponded to the specification sheet. The incandescent gases from the heating of the boiler accumulate practically without losses. The heat that is conserved is then diverted to serve the needs of the energy workers' settlement, and to the subsidiary operation of the GRES. [Text] [Moscow STROITEL'NAYA GAZETA in Russian 7 Sep 83 p 3] 9276

RAIL-CRANE FOR SURGUT GRES--Surgut--The builders of the second phase of the Surgut GRES have received an able assistant--a special rail-crane, the "SKR-3500" that has been put into service here. There has never been such a giant-strongman at the Surgut site. It is designed to lift loads of up to 100 tons up to 130 meters high, which will significantly speed up the assembly of the heavy sections of the main hall of the station. [Text] [By M. Mefodiyev] [Moscow STROITEL'NAYA GAZETA in Russian 7 Sep 83 p 3] 9276

GRES NEAR SAMOTLOR--Nizhnevartovsk--The next large construction project unfolded near the legendary Samotlor. Here preparations have begun for the construction of the Nizhnevartovsk GRES. Its erection is dictated by the growing electrical energy needs of the petroleum industry and enterprises for the processing of casing head gas in the Central Ob region. The startup of the first energy generation block at the station has been set for 1989. Now the subdivisions of the general subcontractor, the Zapsibenergostroy, the Sibprommekskavatsiya and Megionelektroset'stroy trusts are laying roads and

stringing electric power lines to the site, constructing a temporary settlement and cafeteria, and assembling warehouses for equipment. Prior to the end of the current 5-year plan participants in the construction project must still perform 80 million rubles worth of construction. [Text] [By A. Zhdanov] [Moscow STROITEL'NAYA GAZETA in Russian 24 Jun 83 p 2] 9276

GUSINOOZERSK GRES CONSTRUCTION CONTINUES--Gusinoozersk--The pace of work is increasing at the second construction phase of the Gusinoozersk GRES in Buryatiya. The collective of the All-Union Komsomol Shock Construction Team is doing all it can so that next to the four already existing energy generation blocks at the plant six new units are added within the time-limits established by the plan. At all the facilities--the freight car dumpers, the 250-meter smoke stack, the cleaning equipment for the oily effluents--an intensive working atmosphere prevails. Construction of the living quarters for the power workers is proceeding ahead of the planned schedule. The socialist competition in which more than 1,300 people are competing is promoting the increased work pace. [Text] [By P. Adamov] [Moscow STROITEL'NAYA GAZETA in Russian 9 Sep 83 p 2] 9276

UKRAINE RECEIVES SIBERIAN GAS--Donetskaya Oblast(TASS)--Natural gas arriving from Western Siberia was delivered yesterday into the fireboxes of the boilers of the Zuyevsk GRES in the Ukraine. The underground pipeline that will be assuring the requirements of already operating units and those which are projected to be started up in the immediate future has been laid this far. The boiler fireboxes of the Uglegorsk GRES are also being prepared for the shift to gas. [Text] [Moscow SOTSIALISTICHESKAYA INDUSTRIYA in Russian 4 Oct 83 p 1 ] 9276

ANGREN GRES SMOKESTACK COMPLETED--Tashkent Oblast (TASS)--The red flag raised at 330 meters above the Angren river valley announced the labor victory of the construction workers. At the Angren GRES-2, concrete pouring into the body of the smokestack of this thermal station had just been completed on schedule. The GRES-2 which will burn the coal of the Angren field is being completed considerably ahead of schedule. The first of its eight energy generation blocks with a capacity of 300,000 kilowatts is slated to be put into operation next year. [Text] [Moscow STROITEL'NAYA GAZETA in Russian 24 Jun 83 p 1] 9276

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